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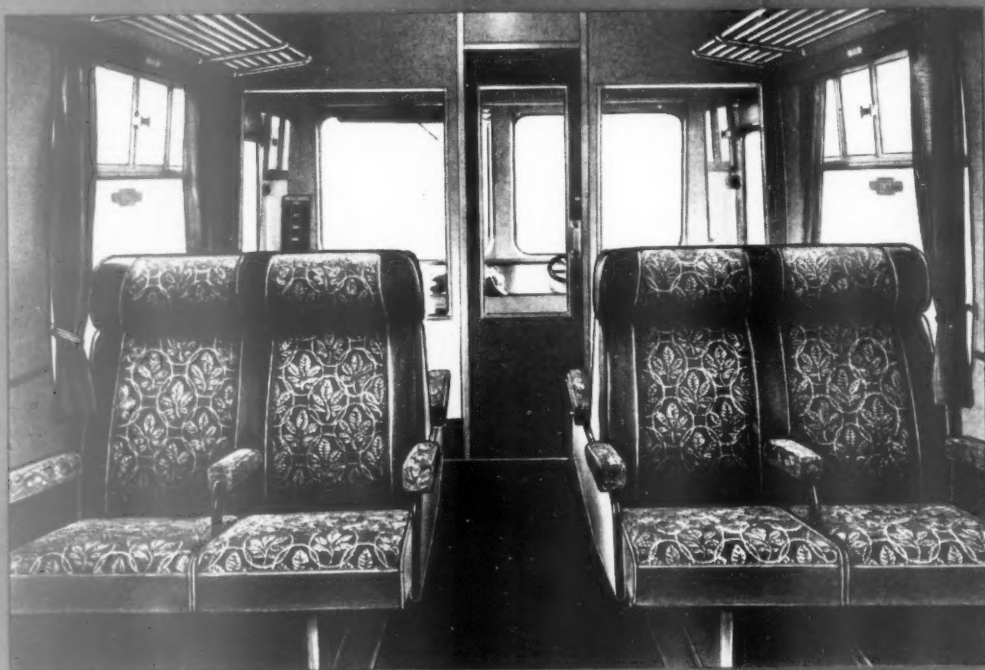
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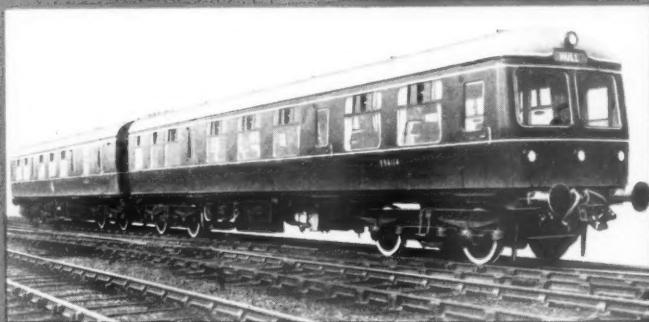
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### Locomotive Policy

**T**HE first of the prototype main-line diesel locomotives for British Railways are due to be delivered in a few months, and an announcement of orders placed by the British Transport Commission for electric main-line locomotives would seem to be imminent. Many people must be speculating at the moment on the policy pursued with regard to the size and power of main-line electric, and—governed by similar considerations—diesel locomotives. With diesel working, policy in North America, although by no means always applicable to conditions in Britain, seems to be to build units of limited power for main-line work, which can be used singly, in tandem, or in multiples as extra power is required. The same tendency is to be seen in several countries of the British Commonwealth. In South Africa, for instance, the first tenders for diesel-electric locomotives under the plan to buy up to 1,500 units stipulate ability to work in multiples of two or three. For electric traction, also, recent developments in South Africa suggest that the administration is thinking in terms of medium-power Bo-Bo locomotives, capable of working in multiple, for its future programmes rather than the North British-G.E.C. 3,000-h.p. "4E" type now working from the Cape—though these, too, have been worked in tandem on severely-graded portions of the route. An

important consideration is availability for mixed-traffic working, exemplified on the Manchester-Sheffield electrified line, and obviously envisaged for diesel working in the placing in 1955 of large orders for mixed-traffic prototypes of 1,000-1,250 h.p. for British Railways. Working diesel units, in particular, in tandem is common practice all over the world. The application of multiple-unit driving controls, enabling one crew to handle several locomotives, has overcome the disadvantages of double-heading with steam trains. British Railways prototype diesels are grouped in three main power classifications, roughly of 800, 1,100, and 2,000 h.p. The actual running of these locomotives together will depend to some extent on their gearing—the smallest class may not be geared for high speeds—but there are obvious possibilities of multiple working with the two higher-powered classes which suggest that British Railways practice is to be kept in line with that found to be the most advantageous in many other parts of the world.

### More Electric Locomotives for Spain

**A**N important criterion of the performance of a locomotive in working conditions is whether the railway concerned is sufficiently satisfied to order further locomotives to the same specification. The order just placed by the Spanish National Railways (R.E.N.F.E.) with the English Electric Co. Ltd. for a further 15 3,600-h.p. 3,000-V. d.c. electric locomotives of the type which has been in successful operation in the north of Spain for some years shows that the first 60 incontestably have proved their worth. Some are in service on the Gijón-León-Ponferrada section, which carries heavy mineral traffic and serves one of the most important industrial areas in the country. Others are working on the Santander-Alar line. The new locomotives, each weighing 118 tons, will be identical with those already in service, which were described in our issue of May 9, 1952. As with the original locomotives, the mechanical parts will be built by Vulcan Foundry Limited, Newton-le-Willows. Built to the Spanish 5-ft. 6-in. gauge, the locomotives are of Co-Co wheel arrangement and have six 1,500-V. traction motors rated at 600 h.p. for one hour and 500 h.p. continuously.

### Colour-Light Signalling in South Africa

**O**NE of the many steps which the South African Railways are taking towards the improvement and modernisation of their tracks is marked by the contract let to the Siemens & General Electric Railway Signal Co. Ltd. for colour-light signalling and power operation of points on the 10-mile line between Dunsward and Alliance, on the eastern outskirts of Johannesburg, which is being doubled and electrified. Automatic signalling is to be installed on the sections of the line east and west of the intermediate station at Van Ryn. Signalling at Van Ryn itself will be controlled remotely by centralised traffic control methods from a panel at Dunsward, using key switches and pushbuttons mounted on the track diagram. Eight pairs of points giving access to a loop will be under remote control from Dunsward, but four dual point controllers will permit local operation by power or, in emergency, by hand. Small illuminated point indicators on the panel at Dunsward will show the routes set up. On the section covered by the resignalling there will be 60 track circuits, 29 searchlight running signals, and four position-light shunt signals. The complete cabling and distribution system for signalling and power supplies is included in the contract. With a similar installation in hand in the Germiston area, this contract is valued at some £530,000.

### Decimal Coinage for India

**T**HE rarity, at least in the British Commonwealth, of basic alterations in currency, and the great extent and population of India make the adoption, as from April 1, of the decimal system of coinage in the Republic, a formidable problem for the railways. In effect, whilst

the rupee remains unchanged, it is to be divided into 100 *naya paise* ("new pice") instead of the present 16 annas, or 64 pice, or 192 pies. The basis of passenger fares is to be changed to the new coinage from the date of its introduction, after which, for some time, a passenger may tender his fare in either the old or the new coinage, whilst booking clerks, who will still hold stocks of tickets with fares quoted in the old currency, will have to convert fares into the new with the help of ready reckoners. It is expected that the basis of freight rates will continue in the old coinage for some time after April, and that the change-over to the new coinage will be effected at the time of the revision of the rates structure, on the recommendations of the Railway Freight Structure Inquiry Committee, which is expected to submit its report to the Railway Board shortly.

### Adoption of Metric System

INDIA is also to adopt the metric system for weights and measures—the first such changeover, we believe, in any country with an extensive railway system already in being. The change is to be completed in five years. A study has been in progress for some time of the effects on the railways and of methods of introducing it without causing inconvenience to the public. Weights used in goods sheds and parcel offices, calculating and weighing machines and weighbridges, and accounting and calculating machines in railway offices will have to be converted or replaced. In the public timetables, distances will be shown in kilometres instead of miles, as will the mileages inscribed on telegraph posts and milestones throughout the 35,000 route-miles of railway. As to supplies of railway material from this country, it will be some considerable time before use ceases to be made of specifications in English weights and measures.

### Southern Region Ten-Car Electric Trains

THE running of ten-car electric trains into Cannon Street, which began last Monday, after certain platforms at that terminus had been lengthened, must certainly help the Southern Region in dealing with peak-hour traffic. The two additional vehicles increase train capacity by some 25 per cent. A brief account of what is being done is given on another page. On the other hand, there seems to be no foreseeable limit to the growth of traffic to and from Cannon Street and Charing Cross, with building development in West Kent; operation at peak hours is a serious problem, aggravated by the awkward railway geography inherited from the old South Eastern Railway. The extension of platforms at Cannon Street across the circulating area, which is still in progress, is a complex task which is being accomplished with the minimum of interference to traffic. A somewhat similar, if less serious, problem, is posed by the running in the near future of 12-car diesel trains on the Hastings line via Tunbridge Wells, but it seems that no major works will be necessary at either Cannon Street or Charing Cross.

### Engineered Timber Structures

DURING the last war, American engineers, faced with an acute shortage of steel, succeeded in designing and building timber structures of all kinds and of the largest size. They established and developed new techniques to overcome the inherent limitation of the size in which timber is available, and by the use of metal connectors and glued laminations were able to exceed without difficulty clear spans in excess of 200 ft. Since the war, the Timber Development Association in this country has developed these techniques, and it is now possible to build timber structures of the largest size which, it is claimed, compete in cost and performance with conventional building materials such as steel and concrete, and are particularly suitable for lightly loaded roofs of wide span, and need little or no maintenance, even in coastal or industrial atmospheres. Other applications of the principle are wide-span trusses and girders, box beams, and rigid frames. The

scope for this method of building in the many varieties of structure which are necessary for railway office and other accommodation, is great.

### Rapid Office Construction at Marylebone

ONLY 16 weeks after construction began, the new office accommodation for the Chief Electrical Engineer, British Railways Central Staff, British Transport Commission, was ready for occupation. Arising from the rapid development of electrification under the British Railways modernisation plan, there has been an urgent need to provide centralised office accommodation at Marylebone, near Commission headquarters, for the staff of the Chief Electrical Engineer, Mr. S. B. Warder, who were previously dispersed in various buildings. The architect to the Commission, Dr. F. F. C. Curtis, therefore, was asked to prepare a design for a building capable of speedy erection. After site investigations, a draft scheme based on the use of the Derwent timber system of construction developed by Vic Hallam Limited, was selected. A feature of the building is the use of a laminated timber beam. The Chief Electrical Engineer is responsible to the Commission for the design of electrical equipment, and although much of this work is delegated to Regional officers, development of electrical traction equipment for the single-phase 50-cycle a.c. system is being dealt with centrally.

### Faster by the West Coast Route

THE new express between Euston and Glasgow Central, the "Caledonian," which is to be introduced by the London Midland and the Scottish Regions on June 17, will cover the 401-odd miles in 6 hr. 40 min. each way, which is 10 min. more than the prewar "Coronation Scot" of the L.M.S.R., with its stops at Carlisle. With a north-bound departure of 4.15 p.m., it will correspond to the "Talisman," its counterpart between Kings Cross and Waverley; the East Coast train, however, departs from both capitals at 4 p.m., whereas the southbound "Caledonian," leaving Glasgow at 8.30 a.m., will reach Euston at 3.10 p.m.—surely too late for those with half-a-day's engagements, and so not justifying the early start. Details of motive power, coaching stock, and composition have not, it seems, been finalised; but the announcement that there will be accommodation for 84 first and 120 second class passengers, with restaurant facilities, points to a light train. In that case, timekeeping should be easy. The present "Royal Scot," allowed 7 hr. 20 min. southbound, with one stop, is a heavy train. The "Coronation Scot" sets were of nine bogies, weighing 297 tons, and seating 82 first and 150 third.

### Railbus Construction in Germany

THE order placed recently by the Western Railways of Cuba for 20 air-conditioned bogie diesel railcars and 20 railcar-trailers is a reminder that though the successful contractor, Waggonfabrik Uerdingen, has built many bogie railcars and passenger coaches in the last 35 years, it has come to be associated more particularly during the present decade with what is the most successful diesel railbus running on the world's railways. Developed and pioneered by Uerdingen in 1949-51, and being in some senses a modern development of a few four-wheel railbuses by the same maker in the mid-1930s, this railbus caught on in Germany because it was shown at once to give extremely low operating cost in conjunction with an acceptable standard of riding up to 45 m.p.h. or so. There are now some 800 of these two-axle railbuses in Western Germany, about 650 of them with one engine of 110/135 b.h.p. and 150 with two engines of 150 b.h.p. each; and there are others in four other countries. Many of these also haul one or two special trailers developed by Uerdingen from the railbus design. Because of the need to spread industrial activity, the German Federal Railway at various times has given orders for these railbuses to the large M.A.N. works at Nuremberg and the small W.M.D. works at Donaueschingen, Uerdingen in each case supplying the drawings and manufacturing instructions.

### Automatic Junctions in Italy

THE increasing attention given of late years to the remote control of junctions at the approach to important stations or other points of heavy interchange traffic, where it is essential to make a large use of train describing equipment, has led to proposals to adapt the latter to give automatic operation, stage by stage, as the trains pass along, subject of course to an overriding control from a central point by which an established sequence can be departed from if circumstances necessitate. Automatic operation of junctions is not in itself new, and such working, controlled by describers, has been applied by London Transport at the Camden Town Junction. In this issue we publish an account of the interesting development in this direction brought into service not long since by the Italian State Railways to deal with the somewhat complicated layout at the approach to Bologna central station, where for some time there has been a large relay interlocking, and the nearby marshalling yard and goods stations. Each individual junction has local panel type relay interlocking equipment but normally is not staffed, the entire working being ordinarily directed from a desk apparatus in a controller's office. The area is, of course, track circuited throughout and provided with colour light signalling.

### Eastern Region Traffic Organisation

AN announcement by the Eastern Area Board of the British Transport Commission earlier this week gives some details of the new organisation which is being set up in pursuance of the policy of the Board to secure devolution of authority and responsibility throughout the traffic departments of the Eastern Region of British Railways. In brief, the organisation provides for the abolition at Regional headquarter level of the posts of Chief Operating Superintendent and Chief Commercial Manager, the responsibility for traffic matters at that level, which will be virtually only matters of policy, being vested in the present Assistant General Manager (Traffic), Mr. H. C. Johnson. Below Regional level, two new appointments as Line Traffic Manager are being made, of Mr. G. F. Fiennes as Line Traffic Manager (Great Northern) and of Mr. W. G. Thorpe as Line Traffic Manager (Great Eastern), corresponding to the existing position of Line Traffic Manager (London Tilbury & Southend), occupied by Mr. J. W. Dedman; these three officers will be guided by the Assistant General Manager (Traffic) on matters of policy, but they will have a high degree of authority in the field of traffic management and will control and co-ordinate all traffic activities on their respective Lines.

At a lower level, seven Traffic Managers are being appointed at places which are already the headquarters of operating districts: Four on the Great Northern Line, at Kings Cross, Doncaster, Lincoln, and Sheffield; and three on the Great Eastern, at Liverpool Street, Cambridge, and Norwich. The names of the officers appointed and of the assistant traffic officers at Regional and Line headquarters are given in our personal columns. At each of these seven places, it is stated, the district officers will form with the Traffic Manager, and under his leadership, a team with a combined local organisation which will exercise a greater degree of authority in day-to-day affairs than has hitherto been devolved from headquarters. In this way it is hoped to achieve the greatest possible degree of speed and simplicity in dealing with local business and administrative problems. In view of the importance of the Peterborough and Ipswich areas it is intended to retain the present commercial officers in these towns, under the supervision of the Traffic Managers at Kings Cross and Norwich respectively. The Traffic Managers, it is also announced, are to be responsible through the district officers under their control for all traffic movement and all commercial aspects of railway business in the territories with which they are concerned. It will be their especial duty to ensure that railway services, facilities, and charges can be quickly adapted to meet the needs of industry and the travelling public and to improve, by all possible means,

the competitive position of the railways in their areas.

Presumably these changes are being made largely for the sake of the flexibility that will be necessary when the new charges scheme is in operation; decentralisation of responsibility will then be vital, to allow of maximum advantage being taken of the new freedom to quote competitive rates. Any step which makes for increased flexibility must, therefore, be considered to that extent desirable. The Eastern Region reorganisation is very largely adapted to the historic geography of the L.N.E.R. and its component railways. If it is an indication of a policy being pursued in other Regions, the nature and degree of reorganisation elsewhere will doubtless vary with the geographical extent of the Region concerned—which, if great, increases the need for decentralisation—and with the convenience of the location of suitable headquarter towns.

Whatever its advantages, the new organisation is bound, because it involves change, to distract the attention of many people holding responsible posts on the railways and in the other nationalised transport undertakings, from their onerous tasks of providing transport, and improving the quality of the services for which they are responsible. It is another of a number of organisational changes—rather than natural developments—imposed on the railways in recent years. Since the railways were nationalised, 10 years ago, with a basically functional organisation, they have had their Regional boundaries altered; the Railway Executive which was set up in the first instance as an all-line management has been abolished; Area Boards have been interposed between the British Transport Commission and the General Managers of the Regions; there have been radical alterations in the headquarter organisation of the British Transport Commission which vitally concerned railway management; and—though this may be regarded more as a natural evolutionary process—the functional element in the organisation of British Railways has tended to give place to responsibility delegated through normal managerial channels. All these changes are disturbing; they absorb a great deal of attention, and therefore of manpower resources.

The new Eastern Region traffic organisation may well result in the flexibility for which it is designed—but at the cost, surely, of distracting from their already pressing duties those who might be expected to exercise common sense and adaptability to make the present familiar operating and commercial organisation serve—which is characteristic of British practice in other spheres. At district level, details of the new scheme are, wisely, being left to be worked out in the light of experience, common sense, and, no doubt, the impact of personalities—as is only natural. To oppose all change is to invite stagnation; but at the present time, British Railways are faced with the necessity to achieve financial stability in a very few years, and to modernise their plant and equipment, besides competing for traffic, improving their services, and raising the morale of the staff—not to mention the day-to-day running of a railway—an organisational change must show promise of very good results indeed if it justifies the disturbance it is bound to cause.

### Modernisation and Management

LAST week the Transport (Railway Finances) Bill received the Royal Assent and the British Transport Commission is assured of obtaining the requisite finance from the State to meet deficits which are expected to be incurred during the next five years, to the extent of £250 million plus interest. It also enables it to charge to capital for three years interest on monies borrowed for the modernisation plan. Everything now turns on the success of this £1,200,000,000 programme and it would be as well if the Commission is left free to get on with the job as speedily as technical skill and availabilities of materials and manufacturing plant permit. Transport must be given a political holiday, because a stupendous task now confronts the Commission which it will be handicapped in carrying through to a successful conclusion if external interference is permitted.



Equally a heavy responsibility falls on the Commission to justify the substantial investment of the national resources which can only be at the expense of our exports. It must be well spent and result in as modern and efficient transport system as in any industrial country; then the country will benefit from proportionately lower transport costs which will benefit the whole community. Many far-reaching decisions on future operating methods and organisation have yet to be taken, the modernisation programme as published being largely a skeleton plan. Some major decisions have been made, as on motive power, but many which will be irrevocable remain to be taken, as for example in regard to types of equipment, the pattern of services both passenger and freight, the number of railway distributing points, the use of road transport, and the extent to which passenger trains should carry merchandise. As important as reaching the right conclusion is the speed with which it is made.

Petrol rationing has shown that there is resistance on the part of traders to transfer from road to rail mainly because the service offered is not comparable as regards speed and regularity of delivery and because frequently costs are higher. If under the new charges scheme, which comes into operation in July and gives the Commission far greater flexibility to adjust charges to costs, though not as much as it sought, British Railways offer competitive prices for the traffics it is economic for them to carry, services must be competitive also. This requires some re-examination of railways methods. Even when the physical condition of the railways is brought to that state of modernisation and efficiency which the programme envisages, traffic will not automatically flow efficiently along them nor, for that matter, flow to them from other transport means without managerial effort. More care must be taken that customers' requirements are learnt and met, and that charges are right; recent experience shows this is not the case now. Hitherto railways have been handicapped by a too rigid charges structure and lack of capital investment. Both are to be removed and to gain the full benefit therefrom old-fashioned methods must be scrapped and modern ideas introduced.

Unfortunately many who deal with the railways relate unhappy experiences of slowness in decision, inefficiency at the lower levels, and a lack of attention to the user's needs. Such is by no means universal, and since the war the operational efficiency of the railways has, commendably, improved greatly. Critics of the railways maintain that there does not appear to have been a similar improvement in management itself, which, they aver, lacks boldness in introducing new methods and is deficient in its handling of the public it serves. This, however, is not confined to the managerial staff but affects railway workers throughout the industry, and their co-operation is required to carry through the plan as the Minister of Transport, Mr. Harold Watkinson, emphasised in forthright terms during the debates on the Bill. A more co-operative spirit is evident, and many work studies are being undertaken to improve working methods; those restrictive practices that remain must not be permitted to stand in the way.

Division into Regions is no doubt the most suitable structure for British Railways, partly because of their history, though some Regions tend to be unwieldy, notably the London Midland. Whether the Area Boards, useful as they have been in some respects, are more of a help than a hindrance to good management needs to be examined. It appears that the slowness of decision which characterises the Commission is due to the reference of all proposals made at the centre and applicable to the railways as a whole to the Area Boards. If they stand in the way of speedy decision in connection with the modernisation plan and hold up its implementation in any particular, then the relations between the Commission and Boards and their respective responsibilities may have to be revised. The plan is so vital to the future of British Railways that quick decision and final responsibility belongs to the Commission itself to whom the General Managers must have direct approach. If Area Boards are permitted to stand between

the General Managers and the Commission, they can cause some confusion of responsibility, which in itself causes delay. British Railways, with the passage of the measure assuring their finances for some years ahead, have been given the green light to proceed with modernisation. It is to be hoped that those responsible for conducting them along modern lines will be as bold in its execution as they have been in its conception.

### Malayan Railway in 1955

A COPY of the report upon the Malayan Railway for the year 1955, received from Mr. C. G. Harrison, Chairman of the Railway Board and General Manager of the system, shows that revenue earned by the whole undertaking—rail, port, ferry and other services—was again the highest ever recorded, namely \$66,792,941. Moreover, the tonnage of goods moved on the railway was the highest before or since the war. The tonnage passing through Port Swettenham passed the million-ton mark for the first time.

The improved results in the past few years indicated that the railway had regained sufficient strength to be able to pay its way in a strongly competitive field. It was however realised that a special effort would have to be made if the competition offered by air, road and sea in the future were to be successfully met. There was little hope in trying to meet rising costs by increasing rates and fares unless at the same time improved services could be offered.

The following are some of the principal results:—

	1954	1955
<b>Railway—</b>		
Passenger train-miles .. .. .	1,601,370	1,858,493
Goods train-miles .. .. .	2,418,011	2,412,834
Passenger journeys .. .. .	6,812,358	7,686,839
Goods tonnage .. .. .	2,122,907	2,237,479
	\$	\$
Passenger revenue .. .. .	14,527,097	16,685,356
Goods revenue .. .. .	29,432,126	31,347,627
Total revenue .. .. .	48,941,056	52,958,961
Working expenses .. .. .	41,415,476	42,504,274
<b>Collection &amp; Delivery Services—</b>		
Revenue .. .. .	614,639	640,846
Working expenses .. .. .	624,632	659,347
<b>Ports—</b>		
Revenue .. .. .	8,089,107	9,915,671
Working expenses .. .. .	6,692,718	7,745,425
<b>Ferries—</b>		
Revenue .. .. .	509,836	548,137
Working expenses .. .. .	559,420	626,890

These financial results for the year and by comparison with 1954 were very satisfactory, especially in view of the handicaps to operation imposed by the continued emergency conditions. However, the outlook at the end of the year was less favourable, as further rises in the costs of labour, materials and fuel were unavoidable, and increases in rates and fares were inevitable, to the detriment of the railway's competitive position. It was estimated that the prospective additional wages and salaries alone would be about \$6,500,000. Although the impact of the national emergency had become relatively light, night trains still had to be preceded by armoured railcars, and shooting at trains caused a number of casualties. Moreover, there were 20 attempts to derail trains during the year, and one resulted in a serious goods train smash.

In September, 1955, the International Bank Mission published its report on the economic development in Malaya. It found that the railway was efficient and needed no reorganisation, but urged consideration of a much more rapid substitution of diesel for steam traction. Another of the Mission's recommendations was that the administration of the railway should remain a commercial corporation within the portfolio of the Minister of Transport, with statutory boards under the chairmanship of the General Manager. The reasons given were that this form of administration had worked remarkably well, and had the advantages of simple control, speedy action, and a compact inexpensive top administration, with the public interest adequately safeguarded. The Mission also applauded the operation of Port Swettenham as part of the railway, but recommended the fusion of the Railway and Port Boards.



On the commercial side, the Mission, while approving the existing rates structure as suitable to present and potential demands, considered that revenue should provide adequately for replacements and a moderate return on capital, which provision might be met by slight increases in rates and fares with due regard to their effect in meeting competing forms of transport. With regard to Singapore, the Mission appeared to agree with the views of the Commission of Inquiry into the Public Passenger Transport System of Singapore that the development of suburban railway facilities there—including an extension to the centre of the city and a suburban terminus at Collyer Quay—should be proceeded with only if the population was in future more widely dispersed. No decision had yet been made by the Government regarding Port Swettenham alternative berthing extension schemes at the existing site or at North Klang Strait; decision in favour of the latter was subsequently made.

The principal features in the year's programme of improvements were the modernising of the signalling at main-line non-interlocked stations, raising the standard of the track to permit of a maximum speed of 55 m.p.h., provision of telecommunications on the East Coast line, fitting of vacuum brake equipment to raise the proportion of braked goods vehicles from 50 to 85 per cent, and the ordering from the English Electric Co. Ltd. of the first consignment of 20 main-line Co-Co type 1,500-h.p. diesel-electric locomotives with 16-ton axle loads, delivery of which was expected to begin early in 1957.

## Manchester-Sheffield-Wath Electrified Lines

(By a correspondent)

**B** RITISH Railways spent seven years on electrifying 67 miles of main line across the Pennines from Manchester to Sheffield and Wath, where the Great Central Railway constructed a yard for collecting traffic from the Yorkshire coalfields. The conversion to electric power was completed on January 3, 1955, and a comprehensive report on the operating and financial results of the scheme is overdue. The account of its origin and development given below shows the difficulties which are apt to beset plans for electrifying a main line carrying a heavy freight traffic through stiff country.

Before the war of 1939-45 the financial aid afforded by the Railways Agreement Act, 1936, induced the London & North Eastern Railway Company to embark on the first large-scale trial of electric traction for freight movement in this country. A dense freight traffic passing over steep gradients and through tunnels was thought to make the Pennine lines specially suitable for electric operation. The L.N.E.R. Board was advised that the cost of conversion would not exceed £2,000,000, while operating economies would ensure a return of about 12 per cent on expenditure. A stock of about 200 steam locomotives employed in 1937 would be replaced by 121 electric locomotives, capable of hauling 1,000-ton mineral trains at twice the average speed of steam-drawn trains. On these premises the case for superseding steam power seemed clear.

By September, 1939, the L.N.E.R. Company had carried out a considerable amount of work on overhead equipment and built an experimental electric locomotive. When plans for resuming work on the scheme were considered after the war, it was decided to substitute for two single-line tunnels at Woodhead a new three-mile tunnel with double lines. The engineers thought that the new tunnel would be constructed in three-and-a-half years at a cost of £2,250,000. Because of unforeseen complications the work occupied over four-and-a-half years and cost about £4,250,000. Regular electrical movement through the new tunnel did not begin until June 14, 1954.

### ELECTRIC MOTIVE POWER

While boring proceeded at Woodhead, an electric locomotive programme was drawn up. The report of the British Transport Commission for 1949 stated that 85 mixed traffic locomotives were to be built, but the next

annual report said that on a re-assessment of requirements 65 locomotives would suffice. The 1951 report gave the number of locomotives completed by the end of the year as 27 and added that they were "the first in this country to incorporate regenerative electric braking." Accordingly arrangements were made to haul all freight traffic electrically on the Wath to Dunford Bridge Section, which lies east of Woodhead, as from February 4, 1952. The B.T.C. 1952 report gave a verdict on this stage of electrical operation in the following terms. "The power supply equipment, including the overhead wire contact system, was practically trouble-free, but it became necessary to reduce train loads from 850 to 750 tons because of a mechanical defect in the locomotives and uncertain adhesion. It is hoped that relatively minor changes to some of the details of the locomotives, determined after an important series of tests, will enable the full loads to be restored."

The Commission did not comment on the progress of the tests in its reports for the years 1953 to 1955, though the completion of 57 mixed traffic locomotives and the first of seven express locomotives was recorded. In the summer of 1956 an official announcement stated that orders had been placed with the suppliers of traction equipment for a radical change in the braking system, along with improvements in cab-heating and window wiping apparatus. If these alterations are effective, 850 tons will still be a poor load for modern electric locomotives, served by elaborate overhead equipment. The machines look clumsy and give their drivers an indifferent lookout. They also proved to be so hard on the permanent way that in 1955 an expenditure of £203,000 was authorised for track improvements on the electrified lines.

### FREIGHT OPERATING STATISTICS

A table of freight working results, published in the 12-weekly numbers of *Transport Statistics*, does not furnish ton-mile figures but merely gives loaded and empty wagon-miles as a measure of traffic volume. In the 48 weeks to December 2, loaded wagon-miles totalled 31,813,500, an increase on 1955 of 209,400, or less than 1 per cent. Both merchandise and minerals accounted for 6 per cent more loaded wagon-miles, but coal and coke produced nearly 852,100 fewer, a decrease of fully 5 per cent. A curious result for 12 weeks to December 2 was an increase of about 312,000, or 10.9 per cent, in merchandise wagon-miles compared with a decrease of 1,213,000, or 2 per cent, for the Eastern Region and one of 17,771,000, or 4.5 per cent, for all Regions. The contrast raises the question whether a considerable number of merchandise wagons was diverted from other routes to the electrified lines for convenience of railway operating.

Over 48 weeks, 1,435,900 freight train-miles were worked electrically, an increase of 14,590 (1 per cent). Loaded train-miles were up 44,380 (3.4 per cent), but empty train-miles were cut by 29,790 (22 per cent). Shunting engine-miles totalled 90,320, a rise of 16,570 (22 per cent). "Assisting required" mileage increased by 5 per cent to 138,290, while "assisting not required and light running" decreased by 2.5 per cent to 451,720 miles. This large amount of unproductive mileage was 21 per cent of the total engine-miles, compared with a percentage of 9 for the whole of British Railways.

Freight train engine-hours numbered 145,830, a decrease of 16,135, or nearly 10 per cent. On the other hand 3,315 more shunting hours were worked, making a total of 18,000. The hours spent by engines on assisting trains and on light running were stationary at about 61,800. These unproductive hours were 27 per cent of total engine-hours, or nearly three times the all-line percentage. The result of the use of electric power on a liberal scale last year was to advance freight train speed from 8.87 m.p.h. in 1955 to 9.88 and to raise the number of wagon-miles worked in a train engine-hour by about a dozen to 207, against 251 for the entire Eastern Region which hauled two more wagons on its average freight train. These statistics do not indicate any gains, either in traffic or in railway efficiency, likely to produce an adequate return on the cost of the Manchester-Sheffield-Wath project.

## LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

### Design of Passenger Rolling Stock

February 12

SIR,—It is surprising that the three-aside seating arrangement with retractable armrests is retained in the prototype second class corridor compartment coaches. At the busier periods passengers may be seen standing in the corridors while others sit three aside in the compartments. In the absence of any clear direction, those occupying seats are reluctant to lift the armrests, especially when they have paid a reservation fee for the seats. Four aside in British Railways standard second class coaches in the Western Region, which up to the present have been built without armrests, is quite comfortable; and much more comfortable than four aside in the armrest types.

Yours faithfully,

R. G. R. CALVERT

45, Woodwaye, Oxhey, Watford

### Locomotives or Multiple-Unit Sets?

February 15

SIR,—The comments on page 191 of your February 15 issue fail to mention one very important point, namely, the very serious damaging effect on the track of the low-slung motors on high-speed multiple-unit stock. This is partly the cause of the rough riding complained of, the other contributing factor being the inherent bad riding of the motor bogie itself because of its rapid deterioration, which latter is brought about by the violent transverse shocks suffered by a vehicle with such a low centre of gravity. It is thus a vicious circle, one cause acting on the other. The London-Brighton line is a case in point; this is probably one of the very highest in cost of permanent way maintenance in the country.

The obvious remedy, therefore, would be a higher centre of gravity; this appears to be the trend in the design of locomotive motor bogies in France. For motor coaches, however, the problem is not so simple, owing to the low floor level. Is not the answer, then locomotive haulage for fast, heavy traffic, and multiple unit traction for less arduous suburban and slower traffics generally?

Yours faithfully,

P. WEIL

49, The Drive, Hove 3, Sussex

February 26

SIR,—I feel that I must comment upon Mr. John Rodgers' proposals for inter-city rolling stock in his letter published in your issue of February 8. The "serious disadvantages" which Mr. Rodgers imputes to multiple-unit stock are exaggerated; the former Southern Railway was the pioneer in multiple-unit operation, and to this day the Southern Region has operated this type of stock for many years with complete success on urban, suburban, and express routes.

The skilful arrangement of rolling stock diagrams ensures adequate flexibility of operation, with varying ratios of first and second class accommodation, according to the type of service to be worked; a variety of two-, four-, and six-car units, corridor and non-corridor, are available, while certain express units have buffet, pantry, restaurant, or Pullman cars, thus enabling the operating department to provide for residential, excursion, holiday traffic, and so on at various times of day.

The maximum number of driving cabs and guard's compartments which may possibly be included in any one train is 12 and 6 respectively; this formation, however, is rarely used in practice, except in emergency, or at the height of the peak season, when six two-car semi-fast type units may be coupled together. The normal formations of four- or six-car units at peak periods require all the available brake van space for parcels traffic, mails, and passengers' baggage at holiday times.

Failures in service are quite rare, and rarely disable the complete train. It is standard practice for the defective unit to be detached, and for passengers to continue their journey in the remaining part of the train; even if this results in overcrowding, it is less inconvenient than waiting for a following booked or special service, often at a wayside station, as would be the case if motive power were provided by locomotive or motor baggage car. A heavy train of trailer coaches hauled by a separate motor baggage car could not be divided in service, or coupled to another train without a separate motor coach being available at the junction point.

Yours faithfully,

G. E. PENFOLD

1, New Cottages, Station Road, Angmering, Sussex

### Site for a Transport Museum

February 15

SIR,—The snag with Brighton Works (or any similar building) is that it cannot expand to keep pace with a collection that will surely go on growing as long as there are railways. The ideal transport museum would consist of sectional buildings on a new site, capable of being added to as the need arose, both by the Commission for B.T.C. relics and perhaps by private subscription for others.

The danger mentioned by Mr. Henry Maxwell in his letter published in your February 15 issue, of vehicles deteriorating beyond hope of restoration unless kept under cover, is illustrated by the fact that three of Britain's few historic electric tramcars have been broken up since 1955 as a result of prolonged open-air "storage"; apart from the London collection, the tram in much of Britain will soon be extinct. If any reader can offer covered space for such vehicles I would be glad to pass on details to those concerned.

Yours faithfully,

J. H. PRICE

15, Kingslyn Crescent, Upper Norwood, S.E.19

### Wagon Supply on U.S. Railways

February 16

SIR,—In your December 7 issue you told how the U.S.A. railways regulated wagon supply and how they met demands up to September last year. The first 1957 bulletin on transport developments circulated by the Association of American Railroads shows that the railways bestirred themselves in the fourth quarter of 1956 and on January 1 owned 1,707,680 wagons, 13,580 more than a year ago. Last year, roughly one out of every six wagons owned went through the shops for heavy repairs. On New Year's Day the number of wagons under repair was 68,100, or 4 per cent of ownership, so that 16,860 more wagons than a year ago were serviceable. The railways now aim at a 3 per cent repairs ratio.

Unluckily, when more wagons are available, loadings are dwindling. In two weeks to January 12, the number of wagons loaded was 79,350 less than in 1956, a decrease of 6 per cent. Grain and ore were the only commodities to pass in larger quantities. Coal loadings, which were up 7 per cent last year on 1955, were down 11 per cent and loadings of general merchandise, representing more than half the total forwardings, were nearly 32,000 fewer, a fall of 4.7 per cent. In 1956, covered wagon loadings were 3.1 per cent fewer than in 1955, while more hoppers, open, and flat wagons were used. It looks as though the U.S.A. railways are, like our railways, losing their hold on high-rated merchandise and becoming dependent on the output of the coalmining, iron and steel, and other heavy industries for maintaining traffic volume.

Yours faithfully,

R. BELL

Frogna, N.W.3

## THE SCRAP HEAP

### Incidental Operating Costs

An irate London woman wrote a letter to British Railways complaining about the soot which had spoiled her once-spotless whites as they hung on the line.

"This," she stormed, "is what comes of having a locomotive depot at the bottom of my garden."

And that was the end of the story? No—it was only the beginning.

British Railways hastened to soothe this housewife's ruffled feelings. They achieved it by sending her a cheque for 10s. to cover the cost of laundering her sooty smalls.

The lady had made no claim, but that didn't matter. Courtesy, it appears, is a speciality of our railways.—*George Quest in the "Daily Herald."*

### Beyer Peacock Locomotives in Japan

The 4-4-0 locomotive shown in the accompanying illustration is one of the "5500" class, built by Beyer Peacock & Co. Ltd. in 1893 for the then Imperial Japanese Government (now Japanese National) Railways. These engines hauled express passenger trains until about 1910. One of them, No. 5501, which had been used latterly for shunting, was recently withdrawn from service at the end of its useful life.

It is a Japanese custom to present a red coat to a man on his 60th birthday; accordingly, a correspondent writes, such a coat, called a *chan-chan-ko*, was ceremonially presented to engine No. 5501 at a ceremony organised by the Japanese Railfans' Club; the presentation was made by a prominent actress, in the presence of Mr. S. Sogo, President of the Japanese National Railways, and Mr. H. Tembo, a retired Vice-President of the J.N.R. and now President of the club. Our correspondent states that the "5500" class will be much missed by many Japanese, who appreciate their excellent workmanship and graceful design. Since the engines

were first delivered, a few alterations have been made, such as the replacement of the original, shapely chimney by one of a stovepipe pattern, and, of course, the fitting of Westinghouse brakes and centre couplers.

### Ex Africa Semper Aliquid Novi

(*Latinity on East African Railways*)

Among the recurrent figures of these days was a man in a white drill suit with "stationmaster" embroidered on his breast. He greeted the Governor: "*Salve, proconsul! ad multos locos peregrinari debetur.*" On this and succeeding occasions he spoke all the time sweetly and fluently in Latin. His was a one-man station and Cicero and Pliny were beside his timetable. The train was *equus ferreus*. . . He wrote in Latin too and kept the Mill Hill Fathers up to scratch; they were just working out their reply to a letter announcing the arrival of several sacks of flour at the station. . . The Governor and Provincial Commissioner gathered their forces and, drawing heavily on the classics, conducted themselves creditably in conversation. But the A.D.C., Charles Lewis, now become *Carolus Ludovicus*, was nearer his own schooldays and the best one at chat. Could there be another African stationmaster, indeed any stationmaster, of such distinction in the whole continent?—*Kathleen Stahl in a B.B.C. broadcast "The Governor's Safari."*

[We understand from East African Railways & Harbours that the stationmaster is Mr. Michael N. Kasule, now stationed at Kaliro. Mr. Kasule entered the railway service as a telegraphist learner in 1941; he held various posts as a telegraphist, then became an Assistant Stationmaster and later Stationmaster. He was awarded a Railway Certificate for Meritorious Service in 1955 after his resourceful action during a terrorist raid on Fort Hill Station. Although it was known at

railway headquarters that Mr. Kasule had attended Catholic schools, his classical erudition had not come to official notice. It appears that he had originally intended to be ordained as a priest and had studied at the Katigondo Seminary in Uganda.—ED., R.G.]

### Fine Job

(*See editorial comment on page 266*)

I am sure that many who, like myself, use Cannon Street Station regularly would wish to pay tribute to the people concerned in the reconstruction and alterations. The inconvenience caused to the travelling public has been negligible compared with the magnitude of the task. It has been a joy, too, to see British workmen going at it full tilt as if jealous of their good reputation.—*From a letter to "The Evening News."*

### British Railways Holiday Guides

(*See our issue of February 15*)

When icicles hang by the wall  
And winter has us still in thrall,  
The bookstall burgeons into bloom  
And out goes that imposter, Gloom.

The Guides are out, and wind and rain  
Will never seem the same again;  
Their magic casements never fail  
To set an end to winter's tale.

They come before the swallow dares  
And always take us unawares,  
As cover girls, with not much on,  
Bid frost and snow and ice begone.

They come, to help us bear in mind  
That Spring is never far behind,  
And we go swiftly in reverse  
And scrap appointments with our  
hearse.

Blest harbingers of holiday,  
Of where to go and where to stay,  
You bring us hope till winter breaks  
And, oh, the difference it makes!

A. B.

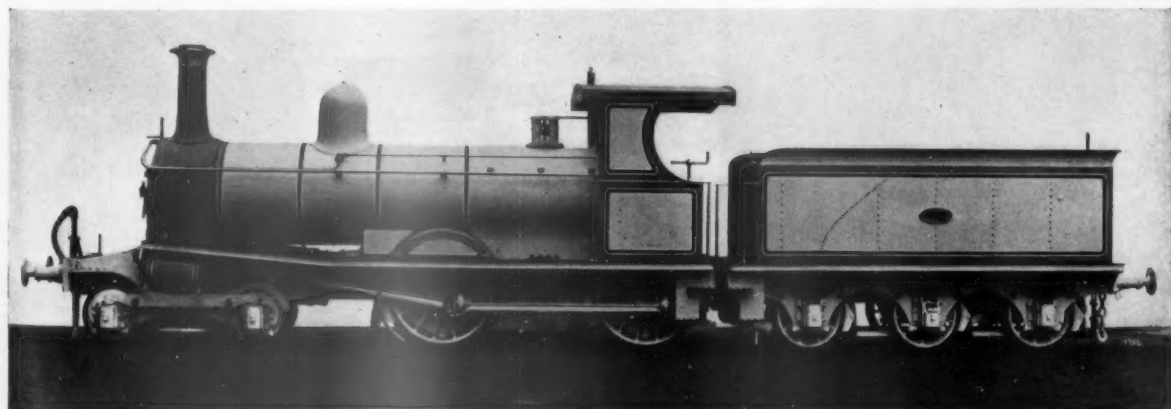


Photo courtesy)

[Beyer Peacock & Co. Ltd.]

Express passenger locomotive, one of the "5500" class built by Beyer Peacock & Co. Ltd. in 1893 for the 3-ft. 6-in. gauge Imperial Japanese Government Railways



## OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

### INDIA

#### Bridge Examination

A committee of three engineers has been set up to examine the condition of bridges on the former Nizam's State Railway (now part of the Central Railway) and to review the existing rules and procedure for the inspection of bridges on the Indian railways. The decision to appoint a committee for this purpose was announced by the then Railway Minister, Mr. Lal Bahadur Shastri, in the course of a statement last year in connection with the bridge collapse near Hyderabad, on the former N.S.R., on September 2.

### CANADA

#### Canadian Car & Foundry Plans

A three-year \$15,000,000 programme of plant construction and modernisation, claimed to be the largest ever undertaken by the railway equipment industry in Canada, has been announced here by E. J. Cosford, President & Managing Director of Canadian Car & Foundry Co. Ltd., a number of the A. V. Roe Canada Limited and Hawker Siddeley group of companies.

The centre of operations will be the Canadian Car & Foundry Dominion plant at Ville St. Pierre, which will be enlarged to nearly double its present manufacturing area, for manufacture inter alia of all-stainless-steel coaches and diesel railcars. The facilities for the production of stainless steel stock

costing more than \$1,500,000 will be the first of their kind in Canada. They will include a cold-roll forming line and comprehensive welding facilities. The eventual production capacity of all types of stainless-steel stock, including "dome" and other standard passenger vehicles, is estimated at 80 units a year.

A three-storey administration building is to be erected, with accommodation for the company's head office as well as for the Car Division offices.

Among the many new structures will be an extension to the freight car erecting shop and special shops for manufacture of bogies, sheet metal fabricating, machining, forging and woodworking. The existing sand blasting facilities will be replaced with modern shot blasting equipment. A new dust collecting system will eliminate pollution and in combination with new cleaning facilities, the automatic painting equipment will be used. The fabricating and erecting shops will be completely re-arranged to take advantage of the most efficient techniques and production flow.

Consolidation of operations will mean a larger concentration of personnel. Services such as cafeterias, medical and first aid facilities and personnel offices will be expanded and remodelled. The track layout of the company's railway will be re-arranged to serve all areas.

#### Further Diesel Haulage on C.N.R.

The conversion to diesel traction of passenger trains on the Canadian National Railways Montreal to Chicago

main line started recently when new diesel-electric locomotives were placed on service between Montreal and Toronto. As other units are received from the manufacturers diesel working will be extended to include the whole of the 850-mile double-track Montreal-Chicago route.

By the end of this month, the "International Limited," "La Salle," "Inter-city Limited" and "Maple Leaf" will all be hauled by 3,500-h.p. locomotives between Montreal and Toronto. The "International Limited" is in its 57th year of continuous service.

### UNITED STATES

#### "Slumbercoaches" on "Denver Zephyr"

The first provision on record in the U.S.A. of sleeping cars specially built for "coach" or second class passengers, whose maximum comfort hitherto has been in open reclining chair cars equipped with leg-rests, is the "slumbercoaches" now running in the "Denver Zephyr" trains of the Chicago, Burlington & Quincy Railroad.

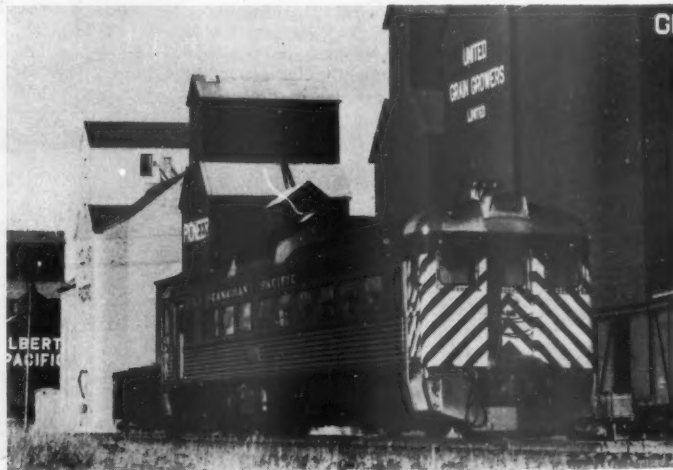
By ingenious dovetailing of the compartments into one another, on the "roomette" principle, each of these 85 ft. vehicles can accommodate 40 passengers, 24 in single and 16 in double rooms.

Each room is complete with all toilet facilities, and in the daytime the beds fold up into the compartment walls, comfortable seating being provided for each occupant. During the first months

### Diesel Haulage on the Canadian Pacific



In the Rockies: The "Canadian" near Glacier, British Columbia



On the prairie: A "dayliner" railcar on the Edmonton-Calgary service at Carstairs, Alberta



of operation the public response has been enthusiastic; on many nights all the accommodation has been sold out, while the average occupancy has been over 80 per cent. A questionnaire as to passenger reactions has produced a favourable response from 95 per cent. of the users. Relatively few of the passengers have been those previously booking Pullman sleeping car space; in the main this is new business. The Burlington has now ordered two further "slumbercoaches" from Budd to supplement the two already in use.

## ARGENTINA

### New Underground Line in Buenos Aires

A new underground line is to be built in Buenos Aires, from Plaza de Mayo Station on the Caballito line to the San Juan Station on the Boedo-Constitución line. It is expected to cost about 13 million pesos and take two years to build.

## FRANCE

### Transport Costs

Reference was made in *The Railway Gazette* of April 27, 1956, to a committee set up to study the cost of providing transport by each means of inland transport. This body committee has just published its first report

which includes interesting figures regarding the traffic conveyed in 1954 by the different means of transport. On a ton-mileage basis the S.N.C.F. conveyed 59 per cent of freight traffic in comparison with 10 per cent by inland waterway and 31 per cent by road, of which 13 per cent was in respect of firms transporting their own goods. On a tonnage originating basis the percentages of traffic conveyed were respectively 16, 4, and 80.

### Improvement at Paris-St-Michel

Until recently the only exit for passengers arriving at the Pont St. Michel Station on the underground section of the South Western Region served by electric trains to and from the Austerlitz terminus was by means of a 7 ft. wide staircase rising directly off the platform to a footbridge leading to an exit on the other side of the station. The staircase limited the flow to 120 passengers a minute and gave rise to congestion which was expected to increase after introduction of the shorter train headway made possible by improved signalling. A 12-ft. section of wall at the back of the platform was demolished and four additional check points installed. By extending back the main exit staircase on the other side of this wall, passengers can now use this exit, or obtain access by the main staircase

to the footbridge mentioned. This has greatly improved the rate at which passengers can be cleared.

## DENMARK

### Recent Accidents

A case of overrunning the distant and home colour-light signals of a modern relay interlocking installation took place recently in foggy weather at Snekkersten station, on the Elsinore-Copenhagen double-track line of the State Railways. A railcar and driving trailer, the latter leading, coming from the single line from Hillerød, collided at about 25 m.p.h. with the empty last vehicle of an outgoing movement. Three persons were killed and several badly injured. There was an overlap of about 295 yd. from the home signal to the point of impact. Another case of failure to observe signals—in this case semaphores—occurred at Lem, on the west coast of Jutland, fortunately without serious results.

## FINLAND

### Underground Railway for Helsinki

The Helsinki city council is reported to have decided on construction of an underground railway. The population of the city and suburbs is approximately 500,000.

## Publications Received

*Engineering Structural Failures.* By Rolt Hammond. London: Odhams Press Limited, Long Acre. 9 in. x 6 in. 224 pp. Illustrated. Price 25s.—As mentioned by Sir Bruce White in his foreword to this book, Robert Stephenson stressed the instructive value of records of failures in large works and their subsequent repair. Yet this subject has been dealt with comparatively seldom in technical papers and other literature. Mr. Rolt Hammond's work is, therefore, the more valuable in its review of the causes, results and rectification of faulty earthworks, harbours, buildings, bridges and tunnels. Among his specifically railway examples are the slips that occurred in cuttings near New Cross and Uxbridge, and the two-mile landslides at Folkestone Warren. Also the failures of the Tay and Quebec bridges, and the defects in Bo-Peep and Arley tunnels. The wide scope of this book also includes failures due to vibration, the lessons of various failures, methods of testing materials and research connected with structural problems. The illustrations and general production are excellent.

*Henry Varnum Poor. Business Editor, Analyst, and Reformer.* By Alfred D. Chandler, Jr. U.S.A.: Harvard University Press, Cambridge, Massachusetts. London: Oxford University Press, Amen House, Warwick Square, E.C.4. 9½ in. x 6½ in. 362 pp. Price 52s.—Anyone associated with the financial or statistical aspects of American

railways must be familiar with the name of the subject of this comprehensive biography, written by his great grandson. Poor's *Manual of the Railroads of the United States* has been a standard reference work for nearly 90 years and is the greatest monument to the career of a pioneer in the systematic collection, compilation, and dissemination of reliable business information. Moreover, Henry Varnum Poor (1812-1905) interpreted his self-imposed task very broadly, and used the data he compiled as a basis for analysing business problems and suggesting changes and improvements. In his earlier years, before the American Civil War, Poor had been editor of the *American Railroad Journal* for 12 years. The present volume is described as a "study in entrepreneurial history" and as such is replete with annotations which give it great value as a reference work; but it is not easy reading. Its reference character is further enhanced by a good index.

*Freight Services to and from Northern Ireland.*—This 56-page illustrated brochure, the first of its kind, has been produced by the Northern Ireland Development Council to give industrialists considering setting-up a factory in Northern Ireland an account of the transport services available. There is an introduction by Lord Chandos, Chairman of the Council. Goods can be carried by five methods across the Irish Sea. General cargo, passenger/cargo, container, and trailer and wheeled-vehicle ferry services are listed

as being operated by one or more of 26 transport organisations, prominent among which are British Railways and British Road Services. The brochure is published by the Northern Ireland Development Council, 13, Regent Street, London, S.W.1, in association with the Northern Ireland Ministry of Commerce, 64, Chichester Street, Belfast.

*Cook's Continental Timetable.*—The March issue contains advance abstracts of the European summer services in force from June 2, notably in relation to timings between London and destinations in Austria, Belgium, Denmark, France, Germany, Yugoslavia, Norway, Sweden, Switzerland, also to the improved Paris-Brussels-Amsterdam service; this last includes first class only, high-speed trains between Paris and Brussels and Paris and Amsterdam termed "Trans Europe Express," with timings of 2 hr. 45 min. between Paris Nord and Brussels Midi and 5 hr. 33 min. (including stops) between Paris and Amsterdam. Advance timings of other important services are given.

*Summer Holidays in the British Isles.*—The 1957 programme of Thos. Cook & Son Ltd. offers a wide choice of holidays in many parts of Great Britain, Ireland, and the Channel Islands, including canal boat holidays in the South Midlands and pony trekking in Perthshire. The programme is well illustrated with photographs and gives much useful information to the prospective holidaymaker.

# Track Loading Fundamentals—5\*

Effect of wheelbase on track stresses

By C. W. Clarke, M.I.C.E., M.I.Mech.E., M.I.E.Aust., M.Inst.T.

WITH the increasing tendency towards the replacement of steam locomotives by diesel-electric locomotives, new problems in track standards and maintenance have arisen. Before the marked change-over from steam to diesel traction in America the loads carried on the driving axles of some of their heaviest locomotives in service were as shown in Table 5.

TABLE 5.—AXLELOADS OF SOME AMERICAN STEAM LOCOMOTIVES

Railroad	Class	Type	Axleload
Pennsylvania	E.6-s	4-4-2	Tons 30.5
"	4-s	4-6-2	32.5
"	T-1 (Duplex)	4-4-4-4	31.2
"	Q-2	4-4-6-4	35
Milwaukee	Hiawatha	4-4-2	32.3
C. & O.	J-3	4-8-4	32.4
Northern Pacific	A-5	4-8-4	33

The axle loads of their diesel-electric locomotives, all having axle-hung traction motors, which have replaced the steam locomotives, are as shown in Table 6.

TABLE 6.—AXLELOADS OF AMERICAN DIESEL-ELECTRIC LOCOMOTIVES

Type	Axleload
Bo-Bo	Tons 27 to 29.7
Co-Co	22 to 29

\* Parts 1, 2, 3, and 4 appeared in our issues, January 11, January 25, February 8 and February 22, respectively

The heaviest steam locomotives in service in Great Britain have axleloads on drivers as shown in Table 7.

TABLE 7.—AXLELOADS OF SOME BRITISH STEAM LOCOMOTIVES

Class	Type	Axleload
A-3	4-6-2	Tons 22.05
Princess Royal	4-6-2	22.0
8	4-6-2	22.0
King	4-6-0	22.0
Merchant Navy	4-6-2	21.0
7	4-6-2	20.25

The axle loads of the diesel-electric or gas-electric locomotives, all having axle-hung traction motors, introduced since the War, are as shown in Table 8.

TABLE 8.—AXLELOADS OF BRITISH DIESEL-ELECTRIC AND GAS TURBINE LOCOMOTIVES

Class	Type	Axleload
No. 10,000	Co-Co	Tons 21.28
M-V gas-turbine	Co-Co	21.8
No. 21,000	1 Co-Co 1	18.44

Whereas in America loads on driving axles of their twin-bogie locomotives with axle-hung traction motors are substantially lower than the loads carried on the driving axles of the steam locomotives they replaced, in Great Britain the twin-bogie type diesel locomotives with axle-hung traction motors carry about the same loads on drivers as the heaviest steam locomotives in service.

A similar position exists in Australia and many other countries, where they now find that some designs of diesel-electric locomotives are more severe on track than the steam locomotives formerly in use. On some railways the loads on the driving axles of twin-bogie type diesel-electric locomotives having axle-hung traction motors have been increased, on the grounds that there is no hammer-blow as in the case of a steam locomotive, but the unsprung weight of an axle-hung traction motor appears to be disregarded. In the case of a steam locomotive there is generally a carrying wheel in the lead and the relief of rail stress afforded on the coupled wheels due to neighbouring wheels is considerable, whereas in any form of Bo-Bo or Co-Co type wheelbase the leading driving wheel has appreciably less relief of rail stress from the adjacent wheel, and furthermore any leading wheel produces a relatively greater rail stress than the inner wheels of a close-spaced wheelbase.

As examples the 4-6-2 Class 7 steam locomotive and the Co-Co No. 10000 diesel-electric locomotive of British Railways might be compared for relative track stresses produced. Fig. 12 shows how Talbot and Zimmermann wheel loads at 75 m.p.h. for the Class 7 steam locomotive are computed, and Fig. 13 the corresponding values for No. 10000. The computed values are shown in Table 9.

VEHICLE										BRITISH RAILWAYS CLASS 7, 4-6-2, STEAM LOCOMOTIVE.										MAX: SERVICE SPEED V=75 m.p.h.	
WHEEL No. AND LOAD—TONS	RAIL-STRESS DETERMINATION								FORMATION LOADING DETERMINATION												
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8					
STATIC LOAD = P	4.30	4.30	10.13	10.13	10.13	8.08	7.95		4.30	4.30	10.13	10.13	10.13	8.08	7.95						
IMPACT FACTOR = K or K <sub>0</sub>	2.69	2.69	6.33	6.33	6.33	5.05	4.97		2.02	2.02	4.76	4.76	4.76	3.79	3.73						
TRACTION AUGMENT = T <sub>v</sub>				0.82								0.82									
HAMMER BLOW = H <sub>v</sub>			2.12	2.12	2.12						2.12	2.12	2.12								
LIVE WHEEL LOAD = J <sub>v</sub>	6.99	6.99	18.58	19.40	18.58	13.13	12.92		6.32	6.32	17.01	17.83	17.01	11.87	11.68						
K = $\sqrt{3/U} = 0.625$										USING MASTER DIAGRAM AND X <sub>1</sub> = 35.4 in.										K <sub>0</sub> = $\sqrt{V^2/12000} = 0.47$	
EFFECT OF 1	6.99	-1.46	-0.28						6.32	+1.14	-0.25										
2	-1.46	6.99	-1.40						+1.14	6.32	+1.64	-0.28									
3	-0.74	-3.72	18.58	-3.53					-0.68	+4.42	17.01	+1.70	-0.68								
4		-0.39	-3.69	19.40	-3.69					-0.80	+1.78	17.83	+1.78								
5				-3.53	18.58	-1.67					-0.68	+1.70	17.01	-0.34							
6					-1.18	13.13	—						-0.24	11.87	—						
7						-1.81	12.92							+0.23	11.68						
EQUIV. WHEEL LOAD = $E_v$	4.79	1.42	13.21	12.34	13.71	9.65	—		6.78	11.08	19.50	20.95	17.87	11.76	—						
TALBOT WHEEL LOAD = TL <sub>v</sub>	13.71 tons, plus 10% for a L.A. = 15.08 tons, (30,710 lb.)								ZIMMERMANN WHEEL LOAD = ZL <sub>v</sub> 20.95 tons (46,928 lb.)												

Fig. 12—Load determination for British Railways Class 7 steam locomotive

VEHICLE		BRITISH RAILWAYS CLASS 10000 C <sub>2</sub> - Co TYPE D-E LOCOMOTIVE MAX: SERVICE SPEED V = 75 m.p.h.																
WHEEL No. AND LOAD - TONS	RAIL-STRESS DETERMINATION								FORMATION LOADING DETERMINATION									
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8		
STATIC LOAD - P	10.64	10.64	10.64	10.64	10.64	10.64			10.64	10.64	10.64	10.64	10.64	10.64				
IMPACT FACTOR - K or K <sub>0</sub>	6.65	6.65	6.65	6.65	6.65	6.65			5.00	5.00	5.00	5.00	5.00	5.00				
TRACTION AUGMENT - T <sub>v</sub>		COASTING		CONSIDERED					-0.19	+0.33	+0.33	-0.33	-0.33	+0.19				
HAMMER BLOW - H <sub>v</sub>																		
LIVE WHEEL LOAD - J <sub>v</sub>	17.29	17.29	17.29	17.29	17.29	17.29			15.45	15.97	15.97	15.31	15.31	15.83				
K = V/√3U = 0.625									USING MASTER DIAGRAM AND X <sub>1</sub> = 35.4 in.								K <sub>0</sub> = V/√12000 = 0.47	
EFFECT OF 1	17.29	-2.76							15.45	+0.62	-0.31							
" " 2	-2.76	17.29	-2.94						+0.64	15.97	+0.96							
" " 3		-2.94	17.29							+0.96	15.97							
" " 4				17.29	-2.94							15.31	+0.92	-0.31				
" " 5				-2.94	17.29	-2.76						+0.92	15.31	+0.61				
" " 6					-2.76	17.29						-0.32	+0.63	15.83				
" " 7																		
" " 8																		
EQUIV. WHEEL LOAD = $\bar{F}_v$	14.53	11.59	14.35	14.35	11.59	14.53			16.09	17.55	16.62	15.91	16.86	16.13				
TALBOT WHEEL LOAD - TL <sub>v</sub>	14.53 tons, plus 10% for a L.A. = 15.99 tons (35,818 lb.)								ZIMMERMANN WHEEL LOAD - ZL <sub>v</sub> 17.55 tons (39,312 lb.)									

Fig. 13—Load determination for British Railways diesel-electric locomotive No. 10000

TABLE 9.—TRACK LOADS COMPARED FOR BRITISH RAILWAYS LOCOMOTIVES

Locomotive	P	C	C <sub>0</sub>	TL <sub>v</sub>	ZL <sub>v</sub>
Class 7	Tons 10.13	Tons 1.36	Tons 2.07	Tons 13.71	Tons 20.95
No. 10000	10.64	1.5	1.65	15.99	17.55

The computations show that at 75 m.p.h. the Class 7 produces 86 per cent of the rail stress value, but 120 per cent

of the value for bearing pressure on the roadbed produced by No. 10000. However, No. 10000 was not designed for the same service as the powerful Class 7, but is equivalent to the Class 5 locomotive of British Railways, which is a 4-6-0 type and carries 19.7 tons on the driving axle. The Hertzian stresses, which are dependent on the ratio P/D, would be greater for the case of the diesel-electric locomotive No. 10000.

Rails generally cost 55 to 70 per cent of the total cost of materials per mile of track, and ballast usually less than 16 per cent. Since ballast is an indigenous product of a country, provision of adequate ballast depth to provide for the loads carried is a comparatively simple and cheap problem in track construction. On the other hand rails often have to be imported and transport charges added, and rail renewals are far

VEHICLE		WESTERN AUSTRALIAN 2-Do-2 TYPE D-E LOCOMOTIVE.																MAX. SERVICE SPEED V = 45 m.p.h.			
WHEEL No. AND LOAD - TONS		RAIL-STRESS DETERMINATION								FORMATION LOADING DETERMINATION											
		1 50"	2 109"	3 50"	4 50"	5 50"	6 109"	7 50"	8 50"	1 50"	2 109"	3 50"	4 50"	5 50"	6 109"	7 50"	8 50"				
STATIC LOAD = P		4.55	4.60	5.20	5.10	5.15	5.20	4.44	4.50	4.55	4.60	5.20	5.10	5.15	5.20	4.44	4.50				
IMPACT FACTOR = K or K <sub>0</sub>		2.60	2.62	2.96	2.91	2.93	2.96	2.53	2.56	0.77	0.78	0.88	0.87	0.87	0.88	0.75	0.77				
TRACTION AUGMENT = T <sub>v</sub>		-0.23	-0.23	+0.48	+0.48	-0.48	-0.48	+0.23	+0.23	-0.23	-0.23	+0.48	+0.48	-0.48	-0.48	+0.23	+0.23				
HAMMER BLOW = H <sub>v</sub>																					
LIVE WHEEL LOAD = J <sub>v</sub>		6.92	6.99	8.64	8.49	7.60	7.68	7.20	7.29	5.09	5.15	6.56	6.45	5.54	5.60	5.42	5.50				
		$K = \sqrt[3]{U} = 0.57$								USING MASTER DIAGRAM AND $X_1 = 27.7$ in.								$K_0 = \sqrt[3]{12000} = 0.17$			
EFFECT OF 1		6.92	-1.39							5.09	+1.43										
" " 2		-1.40	6.99	-0.28						+1.44	5.15	-0.22									
" " 3			-0.35	8.64	-1.73	-0.60					-0.28	6.56	+1.84	-0.23	-0.13						
" " 4				-1.70	8.49	-1.70	-0.59					+1.81	6.45	+1.81	-0.23						
" " 5				-0.53	-1.52	7.60	-1.52					-0.19	+1.55	5.54	+1.55						
" " 6					-0.54	-1.54	7.68	-0.31				-0.11	-0.20	+1.57	5.60	-0.24					
" " 7						-0.29	7.20	-1.44							-0.23	5.42	+1.52				
" " 8							-1.46	7.29								+1.54	5.50				
EQUIV. WHEEL LOAD = $\bar{F}_v$		5.52	5.25	6.13	4.70	3.76	5.28	5.43	5.85	6.53	6.30	7.85	9.64	8.69	6.56	6.72	7.02				
TALBOT WHEEL LOAD = TL <sub>v</sub>		6.13 tons, plus 10% for a L.A. = 6.74 tons, (13,732 lb.)								ZIMMERMANN WHEEL LOAD = ZL <sub>v</sub> 9.64 tons (21,594 lb.)											

Fig. 14—Load determination for Western Australian Government Railways 2-Do-2 type diesel-electric locomotive



more costly than provision of ballast lift. Consequently, the Talbot rather than the Zimmermann load is generally the determining factor.

#### Bogie Wheelbase

Any Bo-Bo or Co-Co type wheelbase will produce greater rail stresses for the same weight on drivers than a wheelbase with leading carrying wheels. To reduce rail stresses it would seem that for a diesel-electric locomotive designed for high-speed operation in either direction the wheelbase should be such that, (a) a comparatively lightly loaded carrying axle is provided at each end of the wheelbase, (b) to prevent the rails tending to lift clear of the sleepers the distance between adjacent axles should not exceed 6 X<sub>1</sub> in., i.e. the distance between the trailing axle on one bogie and the leading axle of the next bogie

motives intended for high-speed services, is to have frame-mounted motors, and it seems that axle-hung traction motors increase lateral forces and rail batter at joints. An investigation<sup>1</sup> into the relation of vertical impact forces on the rail to normal loading on a typical four-axle locomotive, assuming a vertical acceleration of the wheel of 7.5 g. gave, for a static axle load of unity:

	Impact Load	Increase	Relative Increase
(i) Frame-mounted motor with quill drive or equivalent ..	2.31	1.31	1
(ii) Axle-hung motor with torsionally-resilient gearwheel ..	2.78	1.78	1.36
(iii) Axle-hung motor with no resilience in drive ..	3.29	2.29	1.75

per cent less than the "Merchant Navy" class 4-6-2 steam locomotive with 21-ton on driving axles, but 20.5 per cent greater than the "Schools" class 4-4-0, also with 21-ton on driving axles.

With any form of motor drive, whether frame-mounted or axle-hung, due to the low centre of gravity the lateral forces produced can be high, and are appreciably higher for an axle-hung motor unless some sort of lateral restraint is provided. The lateral inertia effects are likely to be more severe on the track than the vertical forces attributed to unsprung weight, and if excessive can spread the gauge or force the dog-spikes outwards. To counteract the high lateral forces it may be necessary to double-spike the rails to the sleepers or fit gauge tie-rods. Twin-bogie type locomotives with axle-hung traction motors tend to produce

VEHICLE		COMMONWEALTH RAILWAYS A1A-A1A TYPE D-E LOCOMOTIVE												MAX. SERVICE SPEED V = 45 m.p.h.			
WHEEL No. AND LOAD - TONS		RAIL-STRESS DETERMINATION								FORMATION LOADING DETERMINATION							
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
STATIC LOAD = P		5.20	5.20	5.20	5.20	5.20	5.20			5.20	5.20	5.20	5.20	5.20	5.20		
IMPACT FACTOR = $K$ or $K_0$		2.96	2.96	2.96	2.96	2.96	2.96			0.88	0.88	0.88	0.88	0.88	0.88		
TRACTION AUGMENT = $T_v$		COASTING				CONSIDERED				-0.09	-0.03	+0.03	-0.03	+0.03	+0.09		
HAMMER BLOW = $H_v$																	
LIVE WHEEL LOAD = $J_v$		8.16	8.16	8.16	8.16	8.16	8.16			5.99	6.05	6.11	6.05	6.11	6.17		
		$K = V^3/3\sqrt{U} = 0.57$								$K = V^3/12,000 = 0.17$							
		USING MASTER DIAGRAM AND $X_1 = 27.7$ in.															
EFFECT OF 1		8.16	-1.67	-0.16						5.99	+1.05	-0.27					
" " 2		-1.67	8.16	-1.67						+1.06	6.05	+1.06					
" " 3		-0.16	-1.67	8.16						-0.27	+1.07	6.11					
" " 4					8.16	-1.67	-0.16						6.05	+1.06	-0.27		
" " 5					-1.67	8.16	-1.67						+1.07	6.11	+1.07		
" " 6					-0.16	-1.67	8.16						-0.28	+1.08	6.17		
" " 7																	
" " 8																	
EQUIV. WHEEL LOAD = $\bar{L}_v$		6.33	4.82	6.33	6.33	4.82	6.33			6.78	8.17	6.90	6.84	8.25	6.97		
TALBOT WHEEL LOAD = $TL_v$		6.63 tons, plus 10% for a L.A. = 7.29 tons. (16,330 lb.)								ZIMMERMANN WHEEL LOAD = $ZL_v$ 8.25 tons. (18,480 lb.)							

Fig. 15—Load determination for Commonwealth Government Railways A1A-A1A type diesel-electric locomotive

should not exceed the values shown in Table 10, if rail lift is to be avoided.

TABLE 10.—MAXIMUM AXLE SPACING FOR BOGIE VEHICLES

13 ft. 6 in. for operation on 45-lb. track
15 ft. 0 in. " " " 60-lb. "
16 ft. 6 in. " " " 80-lb. "
18 ft. 0 in. " " " 95-lb. "

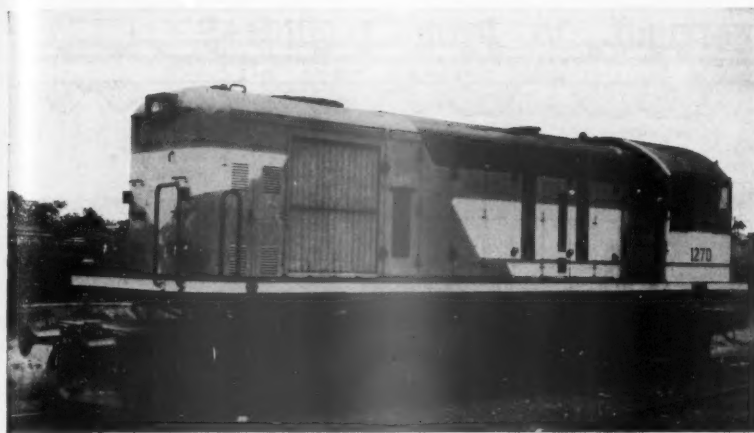
As a further example of wheelbase arrangement on rail stress, three different designs of diesel-electric locomotives, all fitted with axle-hung motors and designed for operation on 45-lb. track may be considered. The calculations are shown in Figs. 14, 15 and 16. The diesel engines installed are of 1,200 h.p., 955 h.p. and 825 h.p. maker's rating respectively. It will be seen that the 2-Do-2 type produces at least 10 per cent lower rail stress values than either of the A1A-A1A types, in spite of its higher power rating. The more usual practice in Europe, for loco-

This investigation indicates the appreciable reduction in impact loads which can be achieved by using torsionally-resilient gear-wheels. If the axle-hung traction motor is to be retained, and its robustness, simplicity and reduced cost certainly prove attractive, then it seems the use of torsionally-resilient gear-wheels must be considered an essential requirement.

Experiments conducted by the Southern Region, British Railways<sup>2</sup>, showed that the rail-seat loads produced by multiple-unit electric stock were higher than for steam trains, and experiments conducted on their behalf by the Building Research Station of the Department of Scientific and Industrial Research showed that the relative damage factor on concrete sleepers resulting from a Co-Co electric locomotive with 16.55-ton axleloads, was only 2.3

cyclic wear of the inner faces of the rails on tangent track. To inhibit this tendency it is preferable to keep the weight of the traction motors down and provide a greater number of driven axles for the same power requirement. Care in the design of the bogies, with special attention to the springing of the bogie and superstructure helps to reduce flange forces produced. Although for an isolated wheel track depression varies as the fourth root of the moment of inertia of the rail section, the effect of the weight of rail for a close-spaced wheelbase is even less. Dr. Talbot found that for equal conditions of wheel loading and under equal conditions of rail support, that increasing weight of rail from 90-lb. to 152-lb., i.e. increasing rail weight by over 50 per cent, only resulted in about a two per cent reduction in overall track depression.





Queensland Government Railways 60-ton A1A-A1A diesel-electric locomotive referred to in Fig. 16

The track depressions under a train take the form shown in Fig. 17. Although the locomotive generally produces the greatest depression of the track, the depressions between the driving wheels do not vary greatly. Where no leading truck wheel is used sharp upward bending occurs, and the steepness of the deflection curve under wheel loads is a measure of the rail stress.

Although the track depression produced by a four-wheel wagon is not as great as that produced by the locomotive wheelbase, the amplitude of the depression between adjacent axles is greater. With the repeated passage of four-wheel wagons the roadbed is subjected to a continuous pounding action of appreciable frequency and magnitude, which can break down the natural

recovery of the roadbed and lead to the formation of sinks or a collapse of the roadbed, if ballast deficiency exists.

For example, consider the case of four-wheel wagons running at 35 m.p.h. and carrying axleloads of 13 tons at 10-ft. spacing on 60-lb. track. The track depression will be as shown in Fig. 18, and varies within the 10-ft. wheelbase corresponding to rail-seat loads ranging from 2.75-tons to 1.25-tons as a wheel travels 5-ft. At at speed of 35 m.p.h. this is equivalent to a blow of 1.5-tons five times per second on a rail-seat, or 3-tons per sleeper. This is of greater magnitude and frequency than the resulting hammer-blow on a rail-seat produced by the driving wheel of a locomotive at the same speed. The continual pounding of a sleeper with a blow of 3-tons five times per second

for say 15 sec. as the time to pass the train will be more severe on the ballast and roadbed than the heavier load due to the locomotive depressing the sleeper and keeping it fairly constantly loaded as it passes over. Unless ballast depth is adequate and fettling of the track is done at frequent intervals to prevent play in the track structure and sleepers flogging, alignment and surface will be lost, resulting in conditions which produce rough riding and a tendency to derail vehicles. The conditions become particularly critical when the natural frequency of the track coincides with the frequency of passing of axles. This is a reason why the maximum speed permitted for four-wheel vehicles is generally restricted in service. As there is little, if any, relief of rail stress from adjacent wheels in the case of four-wheel wagons, the Talbot load can be as high as that produced by the locomotive in many cases.

In the case of a bogie wagon the depressions between the axles of a bogie truck do not vary greatly, but if the bogies are widely spaced the rail can rise above the normal datum level between bogies. If there should be any play between the rails and sleepers this can result in increased rail stresses and a tendency for pounding of sleepers to occur with resulting pounding of the roadbed. To prevent the rails from tending to lift clear of the sleepers, axle spacing between the trailing axle of one bogie and the leading axle of the next bogie should not exceed 6X<sub>1</sub> inches, as shown in Table 10.

Consider the case of bogie wagons operating at 45 m.p.h. and carrying 13.5-ton axleloads on 60-lb. track with axle spacing as shown in Fig. 19. The track depression will correspond to

VEHICLE		QUEENSLAND RAILWAYS A1A-A1A TYPE D-E LOCOMOTIVE										MAX. SERVICE SPEED V = 45 m.p.h.							
WHEEL No. AND LOAD - TONS		RAIL-STRESS DETERMINATION								FORMATION LOADING DETERMINATION									
STATIC LOAD = P		5.00	4.96	5.00	5.00	4.96	5.00			5.00	4.96	5.00	5.00	4.96	5.00				
IMPACT FACTOR = K or K <sub>0</sub>		2.85	2.83	2.85	2.85	2.83	2.85			0.85	0.84	0.85	0.85	0.84	0.85				
TRACTION AUGMENT = T <sub>v</sub>		COASTING				CONSIDERED						-0.08	-0.02	+0.02	-0.02	+0.02	+0.08		
HAMMER BLOW = H <sub>v</sub>																			
LIVE WHEEL LOAD = J <sub>v</sub>		7.85	7.79	7.85	7.85	7.79	7.85			5.77	5.78	5.87	5.83	5.82	5.93				
		K = V/3/U = 0.57								USING MASTER DIAGRAM AND X <sub>1</sub> = 27.7 in.								K <sub>0</sub> = V <sup>2</sup> /12000 = 0.17	
EFFECT OF 1		7.85	-1.57	-0.08						5.77	+0.81	-0.23							
" " 2		-1.55	7.76	-1.55						+0.81	5.78	+0.82							
" " 3		-0.08	-1.57	7.85	-0.12					-0.24	+0.82	5.87	-0.25						
" " 4				-0.12	7.85	-1.57	-0.08					-0.24	5.83	+0.82	-0.24				
" " 5					-1.55	7.76	-1.55						+0.81	5.82	+0.81				
" " 6					-0.08	-1.57	7.85						-0.24	+0.83	5.93				
" " 7																			
" " 8																			
EQUIV. WHEEL LOAD = E <sub>v</sub>		6.22	4.62	6.10	6.10	4.62	6.22			6.34	7.41	6.22	6.15	7.47	6.50				
TALBOT WHEEL LOAD = TL <sub>v</sub>		6.22 tons, plus 10% for a L.A. = 6.84 tons, (15322 lb.)								ZIMMERMANN WHEEL LOAD = ZL <sub>v</sub> 7.47 tons, (16733 lb.)									

Fig. 16—Load determination for Queensland Government Railways A1A-A1A type diesel-electric locomotive

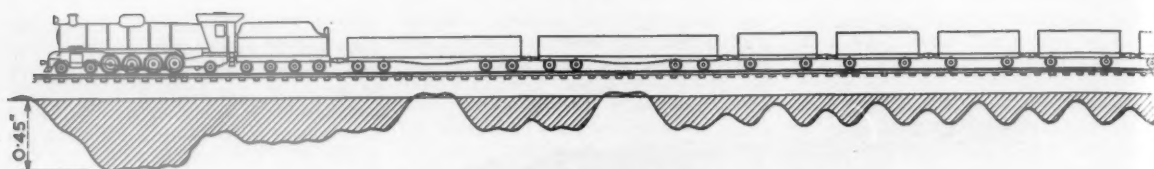


Fig. 17—Track depressions produced by a train

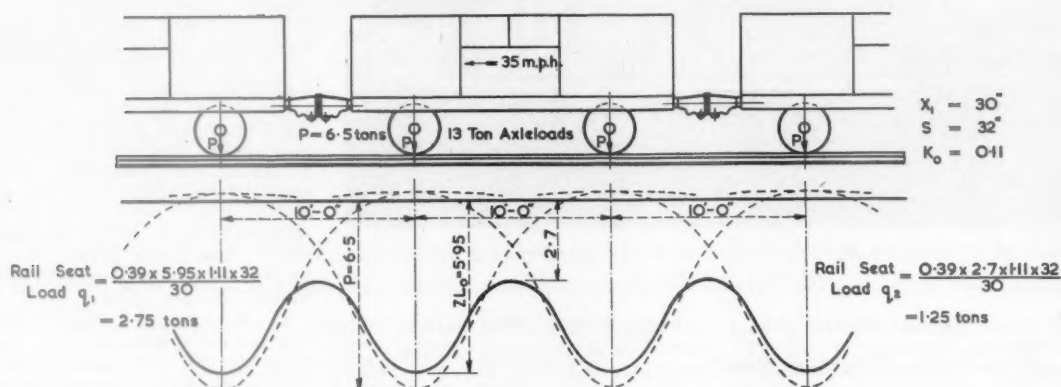


Fig. 18—Track depressions and rail-seat loads produced by a four-wheel wagon

rail-seat loads varying cyclically from 0 to 4.5 tons as each wagon travels 46 ft. At a speed of 45 m.p.h. this is equivalent to a blow on a sleeper of 9 tons 1.5 times per sec. The magnitude of the load variation on the rail-seat is much greater than that for a four-wheel wagon, but the frequency of load application is less. However, the repeated passage of both four-wheel and bogie wagons would be more severe on the ballast and roadbed than the effect of the locomotive. For the same wheel loads the rail stress produced by a bogie

wagon would be less than for the case of a four-wheel wagon, but the effect on the roadbed could be more severe.

In general, it can be taken that the rail stresses produced by wagon stock do not exceed the values produced by the locomotive, but with the repeated passage of wheel loads for both bogie and four-wheel wagons the effect of the ballast and the roadbed could be more severe than that of the locomotive. To obtain improved riding the distance between the bogie centres for coaching stock is lengthened intentionally, but

axle loads are generally lower than for locomotives or wagon stock. Since the time interval for track to recover to its original level is greater than the depression time, the rails may not rise above the normal level between the passage of each bogie truck, owing to the higher operating speeds of coaching stock.

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(To be continued)

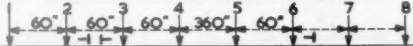
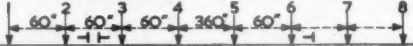
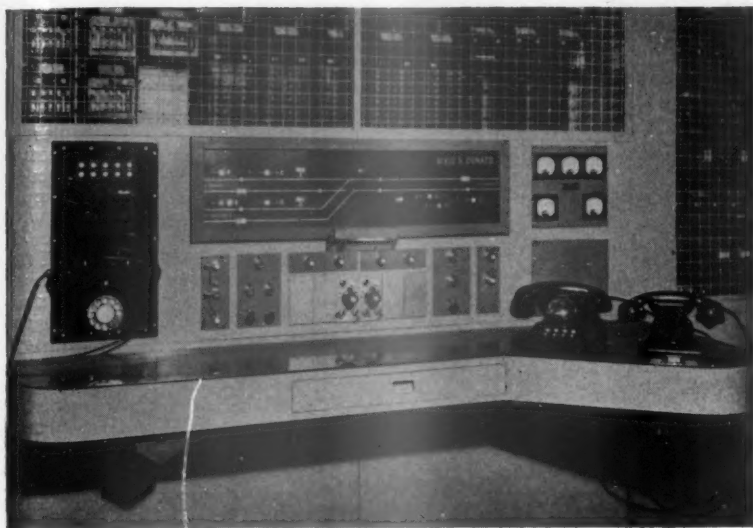
VEHICLE		MAX: SERVICE SPEED $V = 45$ m.p.h.															
WHEEL No. AND LOAD - TONS	RAIL - STRESS DETERMINATION								FORMATION LOADING DETERMINATION								
																	
STATIC LOAD = P	6.75	6.75	6.75	6.75	6.75	6.75			6.75	6.75	6.75	6.75	6.75	6.75			
IMPACT FACTOR = K or $K_0$	3.20	3.20	3.20	3.20	3.20	3.20			1.14	1.14	1.14	1.14	1.14	1.14			
TRACTION AUGMENT = $T_v$																	
HAMMER BLOW = $H_v$																	
LIVE WHEEL LOAD = $J_v$	9.95	9.95	9.95	9.95	9.95	9.95			7.89	7.89	7.89	7.89	7.89	7.89			
$K = V/\sqrt{U} = 0.474$								USING MASTER DIAGRAM AND $X_1 = 22.4$ in.								$K_0 V/\sqrt{12000} = 0.17$	
EFFECT OF 1	9.95	-2.07	-0.29						7.89	+1.50	-0.35						
" " 2	-2.07	9.95	-2.07	-0.29					+1.50	7.89	+1.50	-0.35					
" " 3	-0.29	-2.07	9.95	-2.07					-0.35	+1.50	7.89	+1.50					
" " 4		-0.29	-2.07	9.95						-0.35	+1.50	7.89					
" " 5					9.95	-2.07							7.89	+1.50			
" " 6					-2.07	9.95							+1.50	7.89			
" " 7					-0.29	-2.07							-0.35	+1.50			
" " 8						-0.29								-0.35			
EQUIV. WHEEL LOAD = $L_v$	7.59	5.52	5.52	7.59	7.59	5.52			9.04	10.54	10.54	9.04	9.04	10.54			
TALBOT WHEEL LOAD = $TL_v$	7.59 tons, plus 10% or a L.A. - 8.35 tons, (18,704 lb.)								ZIMMERMANN WHEEL LOAD = $ZL_v$ 10.54 tons, (23,610 lb.)								

Fig. 19—Values of  $TL_v$  and  $ZL_v$  produced by a bogie wagon

## Remote Control of Junctions in Italy

*The State Railways have applied centralised remote control to junctions at Bologna with describer-controlled route setting and facilities for emergency local operation*



*Operating panel at the signalbox at S. Donato Junction normally unmanned but capable of being brought into service if circumstances necessitate*

AN interesting example of the application of remotely-controlled power interlocking automatic and semi-automatic signalling, incorporating route setting actuated through the train description equipment, has been brought into use at and round Bologna, Italian State Railways, where the layout of the approach lines, shown on the accompanying diagram, is somewhat involved and includes a great many junctions, with facilities for alternative train paths. In the Central Station itself, route relay interlocking was put into service as part of the programme for making good war damage, as described in *The Railway Gazette* of March 27, 1953.

The lines all converge for passenger movement, on the Central Station,

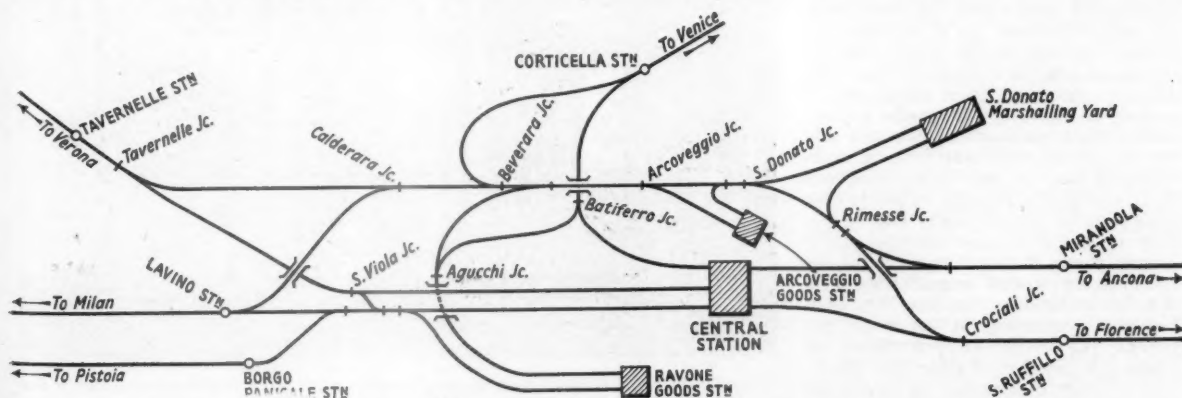
Pistoia line trains travelling over the Milan line to and from the S. Viola junction, while freight trains reach the S. Donato marshalling yard and the Arcoveggio and Ravone goods stations via the various loop, connecting, and spur lines, the junctions along which formerly required 11 signalboxes constantly open. Interlocking block was in operation between these boxes and between them and the six approach stations, Tavernelle, Lavino, Borgo Panigale, Corticella, Mirandola, and S. Ruffillo. It was in service also beyond those stations except on the Pistoia line, which had simple telegraphic block and the Florence line which had automatic signalling. (For a description of this as originally installed see *The Railway Gazette* for January 18, 1935, where the

power frame at S. Ruffillo, now replaced by relay interlocking, was illustrated.)

Consideration was given in 1941 to re-equipping certain junctions when part of the S. Donato marshalling yard was opened and some temporary mechanical signalboxes were brought into use to deal with new connections. It was proposed to instal individual lever electric power boxes and interlocking block, with a certain amount of remote control over selected signals exercised by a traffic controller possessing a co-ordinated view of the general requirements in the area and able to instruct the signalmen how to act for the best, until then difficult for them to decide owing to the complicated nature of the routes and the closeness of the many junctions to each other.

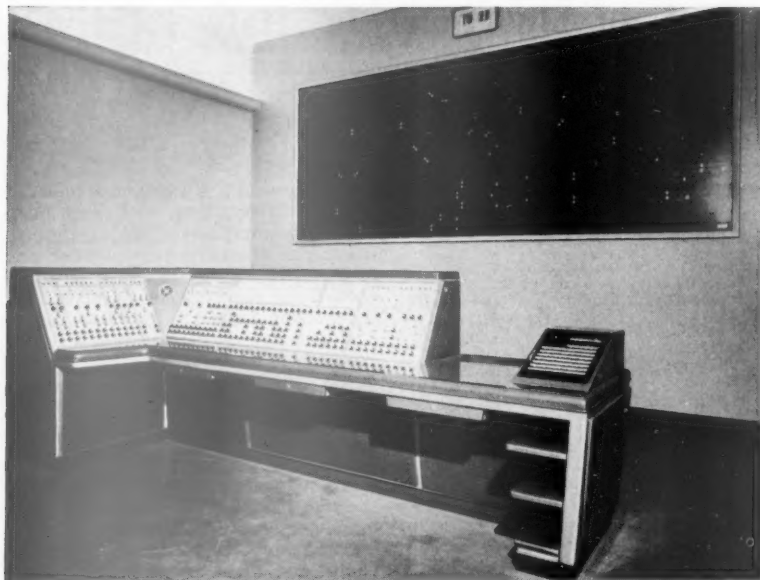
The work necessary to implement this plan had to be stopped in 1943, shortly after being started, and by 1950, when it could be re-commenced, conditions had changed. Relay interlocking had made its appearance in Italy and the use of "coded" C.T.C. type controls afforded an opportunity of regulating the entire working from one central point, with facilities for operating any individual junction from a local relay interlocking, should that be advisable or essential in certain circumstances. As some of the equipment prepared for the original scheme could be used elsewhere to advantage and the modified proposals offered appreciable economic benefits, apart from any to be gained from smoother and more flexible traffic operation, it was decided to adopt them and the complete installation is now in service. The entire area is track circuited and all signals are colour-lights of searchlight pattern.

The control room is at the Central Station adjacent to the ordinary traffic controller's room from which movements on the main line routes converging on Bologna are regulated. The



*Diagram showing railways converging on Bologna*





*Interior of traffic controller's office, Bologna Central Station, showing control desk and illuminated diagram of the area covered by it*

control desk, although operable by one person, is in fact divided so that two can be on duty if desired at times of heavy traffic, corresponding to two areas separated by an imaginary line passing roughly transversely across the Central Station. The aim has been to keep work to a minimum and although the desk has individual control sections relating to each junction—without, however, individual point buttons—these do not require to be used if traffic operations are following the intended order, to govern which the central section of the panel suffices. The controller's work is then confined to sanctioning each movement entering or passing out of the area, for which, of course, known routes are prescribed. The illuminated diagram, separate from the panel, is normally dark, but when a route is established it becomes lighted in white, then in red as its sections become occupied. When a signal at a junction is cleared it appears lighted in green and all others there in red. Illuminated letters give the destination of each movement as it occupies the various sections on its route and the setting of approach locking also is indicated. Passenger train routes can be as long as  $6\frac{1}{2}$  miles and goods 9 miles, containing a number of divisions, and the descriptions are sent forward automatically step by step to the junctions in turn in such a manner as not to take possession of any too early and so unduly restrict other movements. Until a train passes the starting signal at the commencing station cancellation of a description remains possible. The controller can intervene at any stage and change the order of precedence of trains at a junction or effect any alteration in their movements as appear to him advisable. By suitable circuiting

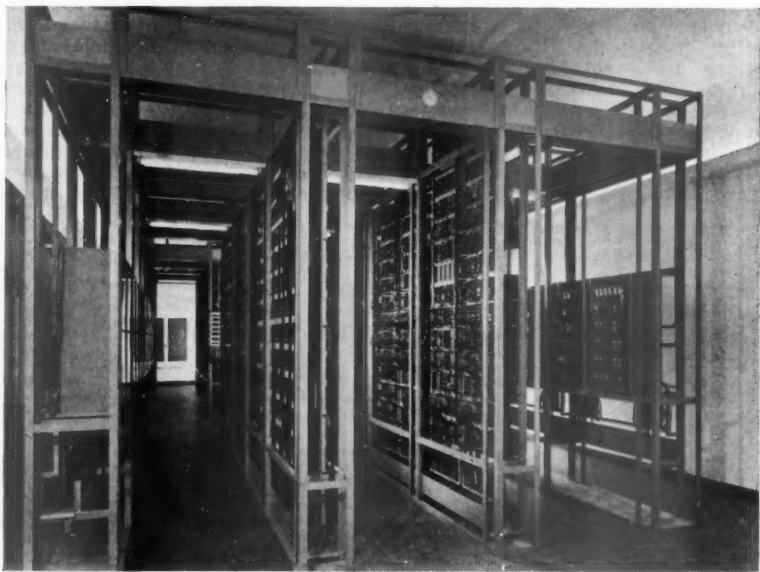
care is taken to ensure that a momentary track circuit failure shall not result in irregular transmission of descriptions.

#### Local Signalboxes

The operating room in each local, or outlying, signalbox has a panel with illuminated diagram, telephone, describer and associated equipment with behind them, a relay room. Any box can be brought into operation if the controller gives permission, after which it can function as any ordinary one, although remaining in certain necessary respects under his guidance. Sealed

equipment is provided, however, by which in case of absolute necessity a box can be rendered completely independent. Electric point machines have normally bolted side hand levers which, when unlocked by a key extracted from a key box nearby, allow of hand operation being resorted to, all signals, of course, being held at danger. Ordinarily the controller electrically releases these key boxes, but when a signalbox is open the signalman there has to co-operate to render a release effective. All remotely controlled points have 2.2-kW. electric heater sets, similar to those used for some time in the Central Station. Track circuits are of the coded type operating on a 50-cycle supply with resonated impedance bonds with three ranges of impulses per sec. 75, 120, and 180, except in one part of the layout where a 75 code suffices to do all that is required. (The coded system has been in operation on the Bologna-Florence direct line since 1950.) About 50 miles of automatic signalling are involved in the layout. The level crossing barriers formerly operated by signalmen are now remotely actuated, except when a nearby signalbox is open.

The remote control circuit system itself is of a four-wire type developed by the General Railway Signal Company, Rochester, N.Y., U.S.A., and the installation was supplied by S.A. Scipione Innocenti, of Bologna, to whom we are indebted for the accompanying photographs. A longer general description, with explanation of the circuit principles used and other details, by Signor F. Tolotti, may be found in the Bulletin of the International Railway Congress Association for September, 1956, and one by Signor A. Liverani in the Italian official railway *Bolletino di Informazioni* for May-June, 1956.



*Interior of relay room at the central traffic controller's office from which the controls are sent to the outlying junctions*



## RAILWAY NEWS SECTION

## PERSONAL

Sir Robert Inglis, formerly Divisional General Manager (Scottish Area) of the London & North Eastern Railway, and later Chairman of the Glasgow & District Transport Committee and leader of a team appointed to investigate the organisation of Rhodesia Railways, has been appointed a Deputy Lieutenant for the County of Dunbarton.

of the Transport Act, 1953, he became responsible to the Commission for the returning to private enterprise of the greater part of the B.R.S. fleet. The passing of the Transport (Disposal of Road Haulage Property) Act, 1956, brought disposals to an end, and General Russell was left with the duty of consolidating the remaining 16,000 vehicles and of operating them through the medium of five limited companies, all trading under the name British Road

has been set up to advise the Commission on the appearance and amenity aspects of new equipment design.

Mr. T. B. Webb, Catering Supervisor, Shipping & Continental Manager's Department, Dover, has been appointed Catering Superintendent, Shipping & Continental Manager's Department, Victoria, Southern Region, British Railways, succeeding Mr. H. Unwin who has retired.



*Maj.-General G. N. Russell*  
Appointed a Member of the Eastern  
Area Board of the B.T.C.



*The late Mr. Thomas Hornsby*  
Divisional General Manager, North  
Eastern Area, L.N.E.R., 1928-36

Major-General G. N. Russell, C.B., C.B.E., General Manager of British Road Services & Chairman of British Road Services Board of Management, who, as recorded in our March 1 issue, has been appointed a Member of the Eastern Area Board of the British Transport Commission, was educated at Rugby and at the Royal Military Academy, Woolwich. During the last war he was Director of Movements in the Middle East and later became responsible for all military transportation in India. After the re-occupation of Singapore he was Transportation Adviser to the Special Commissioner in South East Asia. In 1948 he was appointed Chairman of the Road Transport Executive (later to become the Road Haulage Executive) established under the Transport Act, 1947. By the end of 1951 the acquisition of nearly 4,000 separate undertakings with 40,000 vehicles and their welding into one organisation had provided the country for the first time with a national road haulage undertaking operating as British Road Services. After the passing

Services. At its peak, between June, 1953, and June, 1954, British Road Services earned over £10 million in profits. He was made a C.B.E. in 1943 for his services in the Middle East, and C.B. in 1946 for his services in India.

Mr. George Morton, who retired from the position of Chief Financial Officer to the Railway Executive in 1950, has been elected President of the Retired Railway Officers' Society.

Mr. A. F. Moss, Assistant Operating Superintendent, Scottish Region, British Railways, retired from railway service on February 28.

Mr. George Williams, a Senior Industrial Officer of the Council of Industrial Design, has been appointed Design Officer to the British Transport Commission. He will be responsible for the administration of the work of the Commission's Design Panel, which, as recorded at the end of last year,

We regret to record the death of Mr. Thomas Hornsby, Divisional General Manager, York, London & North Eastern Railway, from 1928 to 1936. Mr. Hornsby, who was a solicitor by profession, served his articles with the late Mr. F. T. Stevenson, Town Clerk of Darlington, and achieved distinction in the Law Society's examination in November, 1894, when he was placed first in honours for the whole of England, and was awarded the Clement's Inn, Daniel Reardon, and Law Notes prizes. He began his railway career in the Solicitor's Department of the former North Eastern Railway in 1895, was appointed Rating Solicitor in July, 1907, and at the time of the 1923 amalgamation, Goods Manager, North Eastern Area, L.N.E.R. He was appointed Divisional General Manager of the area in 1928, and held that position until his retirement in 1936 on appointment as Independent Chairman of the Durham Sales Control Committee. In addition to his railway duties Mr. Hornsby was a director of several road transport companies.

Mr. Nanak Chand Kapoor, General Manager of the South Eastern Railway, India, who, as recorded in our March 1 issue, retired on December 20 last year, was born in Uttar Pradesh on March 12, 1902. He was educated at St. John's College, Agra, and, after graduating as Bachelor of Science, took up an appointment on the college staff. He studied law and for the degree of M.Sc. at Agra College, but before completing these courses sat for an examination for the Railway Service. Mr. Kapoor joined the former Eastern Bengal Railway in January, 1926, as a probationary officer. He was appointed

months in 1951. He then returned to the East Indian Railway as Chief Commercial Manager. After 28 days he again became Chief Operating Superintendent, and on the formation of the Eastern Railway on April 14, 1952, took up a similar position on that system. He became General Manager of the South Eastern Railway in 1955.

Mr. R. Turner, Chief Engineer of Powell Duffryn Technical Services Limited, has been appointed to the board of that company in place of Mr. G. W. Alexander, Chief Engineer of Powell Duffryn Limited.

Manager. Mr. Basu returned to the Railway Board as Director, Traffic (General), on May 5, 1951. He was appointed General Manager of the undivided Eastern Railway in 1954.

Mr. Frederick Bramley, Secretary of the Canadian Pacific Railway, retired on February 28, after 21 years of service in that position. Mr. Bramley was born at Darlington, Durham, in 1886, and studied general railway operating and economics at Leeds and Durham Universities. In 1901 he joined the L.N.E.R. in the freight department



*Mr. N. C. Kapoor*  
General Manager, South Eastern  
Railway, India, 1952-57



*Mr. A. K. Basu*  
Appointed General Manager, South  
Eastern Railway, India

Assistant Traffic Superintendent, and, within a few months, was selected to officiate in the Senior Scale. In 1937 he was transferred to the East Indian Railway, where he served as a senior scale officer in various divisions, including the Head Office, and was promoted to be Deputy Chief Operating Superintendent (Emergency) in July, 1942. Between 1942 and 1948 he served successively as Deputy Chief Operating Superintendent (Goods); Deputy Chief Commercial Manager; Divisional Superintendent, Allahabad; Divisional Superintendent, Moradabad; Divisional Transportation Superintendent, Dhanbad, and Divisional Superintendent, Asansol. In June, 1948, he was appointed Traffic Manager, Oudh & Tirhut Railways, and, at the end of that year, Chief Commercial Manager. Mr. Kapoor was later transferred to Bombay, where shortly afterwards he became Chief Transportation Superintendent, Great Indian Peninsula Railway. While with the G.I.P. he was deputed to the Bombay Port Trust as Officer on Special Duty for a period of about three

Mr. A. K. Basu, who, as recorded in our March 1 issue, became General Manager of the South Eastern Railway, India, on December 20, 1956, is 54. He began his railway career on March 23, 1927, when he joined the North-Western Railway as an assistant transportation (traffic) officer. In August, 1934, he was transferred to the former East Bengal Railway as an Assistant District Traffic Superintendent, and, in 1939, he was transferred to the Railway Board as a Deputy Director, Traffic (Commercial). In 1944, Mr. Basu was transferred to the then Bengal Assam Railway, serving successively as Deputy Chief Commercial Manager, Deputy Chief Transportation Manager, and Chief Commercial Manager. In 1946 he became a member of the Standing Advisory Committee of the Railway Board for the formation of the Assam Railway, and, the following year, was posted as Chief Administrative Officer on that system. In 1948 he joined the former Oudh & Tirhut Railway and subsequently served as its Traffic Manager, General Manager, and Chief Commercial

and, in the next 15 years, during which he was selected for training in various departments of the railway, his duties included acting on the personal staff of Sir Guy Geddes, and service as Private Secretary in turn to the late Sir Guy Granet, then General Manager of the Midland Railway, and to the late Sir Samuel Fay, then General Manager of the Great Central Railway. Mr. Bramley also served on the personal staff of the late Sir Ralph Wedgwood, Chief General Manager of the London & North Eastern Railway. From 1916 to 1919 he served as a Staff Captain in the Royal Engineers. On his discharge in 1919 he joined the Canadian Pacific Railway in London as Secretary to the late Sir George McLaren Brown, the European General Manager. In 1926 he was appointed Special Representative in London, and, in 1932, he became acting Agent at Southampton. The following year he was appointed Agent in Northern Ireland for C.P.R. and Canadian Pacific Steamships with headquarters at Belfast. His appointment as Secretary of

the company took place three years later on January 1, 1936.

Mr. T. F. Turner, who succeeds Mr. Bramley as Secretary of the Canadian Pacific Railway, joined the company at Moose Jaw in 1924. He was Secretary to the General Superintendent in 1940 when he went on active service as an officer of the King's Own Rifles of Canada. Mr. Turner proceeded overseas in 1942, returning to Canada in 1943 when he was selected to attend the U.S. Marine Corps command and staff college at Quantico, Virginia, after which he joined the Marine Corps and the U.S. Army in joint training on the Pacific Coast in planning for Canadian participation in the Pacific theatre. He later served on the general staff of the 6th Canadian Division, seeing active service in Europe and returning to Canada in July, 1945, in connection with organisation of Canada's Pacific force. Since returning to the C.P.R. in November, 1945, Mr. Turner has served with the engineering department at Moose Jaw, and, since 1947, at Montreal with the Canadian Pacific Transport Company in the office of the Chairman & President. He has been Assistant Secretary since January 1, 1956.

Mr. A. M. Hawkins, Assistant Chief Engineer, Rhodesia Railways, has been appointed Chief Engineer of that system, as from January 9 this year. He succeeds Mr. F. J. McIntosh, whose retirement was recorded in our February 22 issue. Mr. C. K. Thompson, formerly Assistant Chief Engineer (New Works), becomes Assistant Chief Engineer.

Mr. H. E. R. Bastin, District Commercial Manager, Cardiff, Western Region, British Railways, has been appointed District Commercial Manager, Bristol.

Mr. H. M. Lattimer, Assistant (Modernisation) to Chief Operating Superintendent, Scottish Region, British Railways, has been appointed Assistant Operating Superintendent as from March 1, 1957.

Mr. T. C. George has been appointed Assistant Secretary of Maidstone & District Motor Services Limited.

Mr. A. J. White has been appointed to succeed Mr. W. M. Dravers as General Manager of Maidstone & District Motor Services Limited and that company's subsidiary as from a date to be agreed. Mr. White is at present General Manager of the Devon General Omnibus & Touring Co. Ltd.

Mr. R. G. F. Griffin has been appointed Manager Overseas Manufacturing of F. Perkins Limited, and Mr. John Taverner becomes Chief Instructor of the Instruction School at Peterborough.

Mr. William F. Gilbertson, Deputy General Manager & Works Superintendent of the Ebbw Vale section of Richard Thomas & Baldwins Limited, has been elected President of the Iron & Steel Trades Employers' Association.

Mr. G. C. Allott has been appointed Chairman of Weymann's Limited and a director of Metropolitan-Cammell-Weymann Limited, in succession to Mr. James Don, who retired on December 31, 1956. Mr. G. W. Scott, Jr., has been elected to the board of Weymann's Limited.

Mr. J. Peter Ford has been appointed an executive director of Associated British

Engineering Limited with effect from March 1. Mr. Ford, who is 44, is Vice-Chairman of the Institute of Export and a member of the Council of the London Chamber of Commerce.

Lt.-Colonel G. J. Shepherd, Chief of Police, Scottish Area, British Transport Commission, retired on February 23 this year.

#### NEW ORGANISATION ON EASTERN REGION

In connection with the new organisation now being set up by the Eastern Region of British Railways, to which editorial reference is made in this week's issue, the following appointments have been announced:—

Mr. G. F. Fiennes, Acting Operating Superintendent, becomes Line Traffic Manager (Great Northern), and Mr. W. G. Thorpe, District Operating Superintendent, Nottingham, has been appointed Line Traffic Manager (Great Eastern).

The separate positions of Chief Operating Superintendent and Chief Commercial Manager, Eastern Region, will be abolished. Mr. Fiennes, Mr. Thorpe, and Mr. J. W. Dedman, Line Traffic Manager, London, Tilbury & Southend, will be guided by Mr. Johnson on matters of policy, but they will have a high degree of authority in the field of traffic management and will control and co-ordinate all Traffic activities on their respective Lines.

Mr. Johnson will be assisted at Regional headquarters by the following:—

Mr. H. Hoyle, now Trains Assistant to Operating Superintendent, as Movement Officer.

Mr. F. G. Crabb, now Acting Assistant Commercial Manager, as Commercial Officer.

Mr. Fiennes and Mr. Thorpe will be assisted by the following officers:—

#### Great Northern

Mr. S. D. Ward, now Movement Superintendent, L.T. & S. Line, as Movement Superintendent.

Mr. J. Hancock, now Assistant to Commercial Manager (Passenger), as Commercial Superintendent.

#### Great Eastern

Mr. D. Fenton, now Assistant to Operating Superintendent, as Movement Superintendent.

Mr. G. Coaker, now Assistant to Commercial Manager (Development), as Commercial Superintendent.

The undermentioned Traffic Managers are being appointed:—

#### Great Northern

Mr. G. F. Huskisson, now District Passenger Manager, Liverpool Street, to be Traffic Manager, Kings Cross.

Mr. R. B. Temple, now District Goods Manager, Sheffield, to be Traffic Manager, Sheffield.

Mr. E. J. Stephens, now District Operating Superintendent, Doncaster, to be Traffic Manager, Doncaster.

Mr. H. W. Graham, now District Commercial Manager, Lincoln, to be Traffic Manager, Lincoln.

#### Great Eastern

Mr. H. W. Few, now Acting Assistant Operating Superintendent, to be Traffic Manager, Liverpool Street.

Mr. W. A. G. Suddaby, now District Operating Superintendent, Stratford, to be Traffic Manager, Cambridge.

Mr. G. G. Goodings, now Area Freight Manager (B.R. & B.R.S.), Norwich, to be Traffic Manager, Norwich.

The following elections have been announced by the Institution of Locomotive Engineers:—

#### Associate Members

Mr. H. H. Abbott, Diesel Electric Superintendent, Nigerian Railway Corporation.

Mr. A. E. G. Ackroyd, Deputy Chief Traction Projects Engineer, English Electric Co. Ltd.

Mr. S. Fletcher, Traction Technical Service Engineer, English Electric Co. Ltd.

Mr. G. Haider, Assistant Works Manager, Repairs, North Western Railway, Pakistan.

Mr. N. C. Kilshaw, Technical Assistant (Diesel) to Chief Mechanical & Electrical Engineer, British Railways, Eastern & North Eastern Regions, Doncaster.

Mr. R. W. Leslie, District Locomotive Superintendent, Inhanga, Trans-Zambesia Railway, Portuguese East Africa.

Mr. D. G. Ousey, Traction Projects Engineer, English Electric Co. Ltd.

#### Reinstatement as an Associate Member

Mr. D. N. Dey, Chief Engineer, Sapulchre Brothers (India) Private Ltd., Calcutta.

#### Associate

Mr. L. W. Harding, General Sales Manager (Railways), Laycock Engineering Limited.

#### Graduates

Mr. T. M. Abbott, Engineering Apprentice, British Railways, Southern Region, Eastleigh.

Mr. M. L. G. Amsden, Graduate Mechanical Engineer, British Railways, Southern Region, Eastleigh.

Mr. A. H. Bloomer, Traction Engineer, English Electric Co. Ltd.

Mr. C. P. Boocock, Engineer Apprentice, British Railways, Southern Region, Eastleigh.

Mr. D. W. Green, Engineer Apprentice, British Railways, Southern Region, Eastleigh.

Mr. J. P. Marson, Engineer Graduate, British Railways, London Midland Region, Willesden.

Mr. M. P. Millard, Engineer Apprentice, British Railways, Southern Region, Eastleigh.

Mr. D. W. Miller, Apprentice Electrical Engineer, British Railways, Eastern & North Eastern Regions, Doncaster.

Mr. A. C. Tribble, Project Engineer, English Electric Co. Ltd.

#### Transfer Graduate to Associate Member

Mr. J. R. Nagarwalla, Superintendent, Production Supply, Tata Locomotive & Engineering Co. Ltd., India.

Mr. H. A. W. Harris, Design Team Leader, Gydar Limited, Engineering Consultants, Weston-super-Mare.

Mr. K. C. Lodge, Secretary & Commercial Manager, Owen & Dyson Limited, who is retiring on March 31, began his career with that company as an apprentice in 1911. He has served under three generations of the Dyson family and remembers the time when wrought iron open spoke and solid spoke wheels were being manufactured by about 120 employees at a rate of 80 to 100 mounted pairs of wheels and axles a week. During the 1914-18 war Mr. Lodge served with the Royal Engineers. A Fellow of the Chartered Institute of Secretaries, he was appointed Secretary of Owen & Dyson Limited in 1938. In private life Mr. Lodge is an indefatigable parish worker. Keenly interested in music, he is an Associate of the London College of Music and has held appointments as organist.



## NEW EQUIPMENT AND PROCESSES

### Close Voltage Regulation Alternator

THE Newphase alternator is of application where very close regulation of output from alternators is required than can normally be obtained from the manufacturer's standard equipment. The unit is suitable for building into standby equipment for electric signalling systems, and for power supply for recording instruments fitted into rail inspection cars. The alternators are available in a range of all usual sizes up to 90 kVA. in nine basic frame sizes for three-phase and single-phase output. The machines are stated to be lightweight but strong, well ventilated, able to deal with heavy motor starting currents, and efficient with low maintenance requirements.

The standard designs are provided with phase and load compensation, very similar to a compound wound d.c. generator but with the addition of excitation self-adjustment for lagging power factor loads. Thus it is not possible to compensate for all variables which may arise in operation, for example, changes in machine or ambient temperature, or variations of governing of the prime mover.

With the Newphase alternators, an additional voltage control is incorporated, which converts from a compensated machine to a closed loop system, with a positive voltage reference, against which the output voltage can be compared. This control is made up of three main sections: an error detecting arrangement, which utilises a cold cathode discharge tube as the non-linear element of a four-arm bridge, fed from the rectified output voltage of the alternator via an auto transformer, which steps it up to a suitable value; an amplifier for magnifying the power of the error signal; and the control arrangement con-

nected in the main excitation circuit, any departure from the nominal voltage due to other causes being automatically corrected to within close limits.

The voltage recovery time is stated to be exceptionally rapid. All the components of the additional control unit are static and are incorporated in a compact box mounted on the frame of the alternator, the machine thus being completely self-contained. Ratings of all components have been stepped up to give higher safety factors, and the circuit modified so that it is now suitable for intermittent operation (which may arise when machines are idled), without possibility of damage. A range of saddle-mounted switchboards can be supplied with the units.

The delivery position is 16 weeks at present. Prices will be quoted on application to the manufacturer, Arthur Lyon & Co. (Engineers) Ltd., 6, Carlos Place, London, W.1.

### Automatic Book Sales at Stations

SUITABLE for the sale of books on stations and so on, the Automat Book Machine will take 160 books of the paper-backed type in four separate columns. By inserting the requisite coins the customer may obtain the book of his choice. The books are dispensed by the gravity principle, each item replacing the sold book by downward weight of each column.

Being completely mechanical in operation, the machine requires little attention. It is almost impossible for counterfeit money to be used.

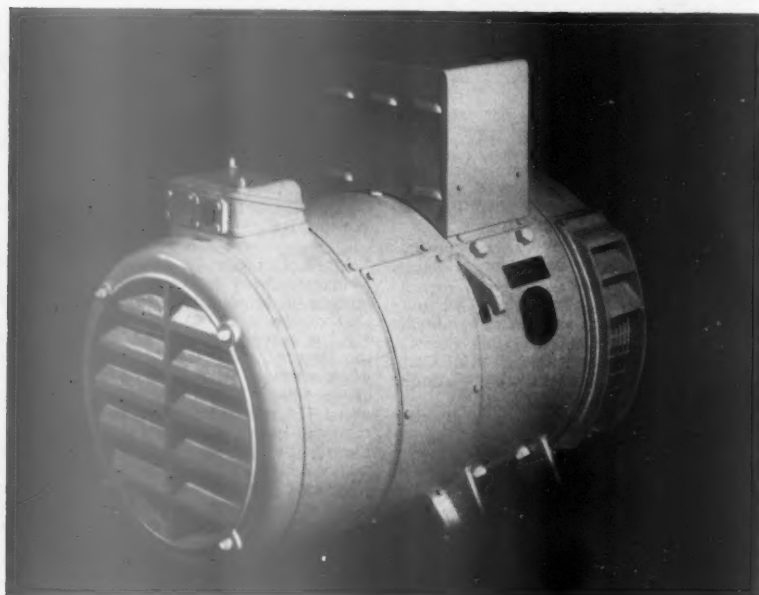
The machine is finished in polished stainless steel. Overall dimensions are: height 3 ft. 4 in., width 3 ft. 2 in., depth (front to back) 9 in.



The price of the Automat book machine is £213 14s. 3d. and delivery can be made in 14 days. The manufacturer is Automat Machine Sales Limited, Challenge House, 174, Perry Vale, London, S.E.23.

### Braided Flexible Steam Hose

THE Warne No. 216 flexible hose for use with saturated steam of pressures up to 150 p.s.i., and temperatures of 365° F., has been introduced. The hose is suitable for applications where vibration is encountered, for example, locomotive steam injector pipes, or where the hose is liable to be subjected to impact blows, as in a works or depot. It has a synthetic rubber lining and cover with high tensile galvanised steel wire braid reinforcement. The manufacturer claims a long service life for the product because the steel braid reinforcement is unaffected by the tem-



perature conditions—traditional fabric reinforced high-pressure steam hose having a limited life due to charring of the reinforcing plies or braids.

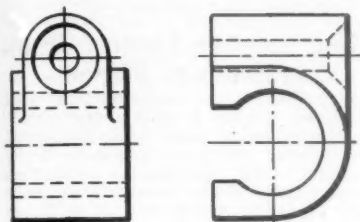
In the event of failure, the steam leak of the No. 216 hose will be localised and will not immediately result in a hazardous condition, as there will not be the tendency for a longitudinal splitting of the reinforcing braid.

The price and delivery may be obtained on application to the manufacturer, William Warne & Co. Ltd., Barking, Essex.

## Nylon Cable Clips

**E**ASYWAY cable clips, made from a nylon insulating material, are suitable for retaining low-voltage cables, such as telephone wiring. Applications could include the anchoring of small cables and bell push wires in railway passenger coaches, dining cars and so on.

As may be seen from the enlarged illus-



tration, the clip is moulded with one hole for a locating pin. Each clip is supplied with a  $\frac{1}{8}$  in. long carbon steel pin for this purpose. The opening of the clip is approximately  $\frac{1}{8}$  in. dia.

The Easyway cable clips are available for prompt delivery. The price will be quoted on application to the manufacturer, Metway Electrical Industries Limited, Metway Works, Brighton 7.

## Compact Coffee Machine

**T**HE Martian espresso coffee-making machine is designed to produce coffee at short notice. Applications include small refreshment rooms, and refreshment cars in trains. Because the pressure system is self-contained, obviating the need of a constant water supply, the machine can withstand movement of a train in motion, and it can be used from any convenient counter adjacent to a power supply point.

The Martian, which has no moving parts to wear out, is thermostatically-controlled. It is also suitable for making hot chocolate and warming soup.

The machine, made mainly of light alloy, is of modern design, the main section being a metal sphere in which water is electrically heated and pressurised to 55 p.s.i. It is smaller than existing and standard types of filtration machines; dimensions are, height 18 in., maximum width at the pedestal base 12 in., and cubic capacity 2½ pints. This volume of water provides sufficient filtered coffee to make, with milk addition, 40 four-ounce cups of *capuccino* (white) coffee per hour.

The net weight of the Martian is 9½ lb., and with accessories, 12½ lb.

The machine operates at 800 W., and is normally supplied for a range of 200-240 V., but 100-V. and 24-V. versions are available—the latter to suit steam-hauled train lighting.

Assuming warm water is put in the con-

tainer, the time to heat to the controlled temperature is about 8½ min. Using cold water, the time is about 20 min.

Safety valves and steam devices ensure that the pressure sphere is safe under all conditions of operation. A steam projection tube protrudes from the side of the sphere. This is for preparation of *capuccino* coffee; steam under pressure heats and froths the milk in a container, which is then added to the coffee.

The price of the machine is £31 10s. Delivery on the 200-240 V. version is from stock, the 110-V. and 24-V. types being three to four weeks. The distributor in this country is A. & M. G. Sassoon, 54, Victoria Street, S.W.1.

## Electric Train Heaters

**T**HE electric heaters installed in the new rolling stock for the Liverpool Street-Southend service, Eastern Region, are representative of the heating equipment supplied by the manufacturer to railways and road service operators at home and overseas.

In the case of the Southend trains, each heater contains an Alumbro-sheathed element of double-hairpin shape, rated at 500 W., 300 V. The heater is insulated for a voltage to earth of 1,500, secondary insulation being provided in the form of glazed porcelain insulators. An outer casing of 14-gauge mild steel encloses the element and is bolted to the terminal box body, which has a removable top cover for access to the connections. Fixing plates for floor mounting are integral with the terminal box at one end of the heater and with the casing at the other end. The element slides into the casing, in which it is correctly located by guide plates. If replacement is necessary, an element can be withdrawn after unbolting the casing from the terminal box and removing the terminal box mounting bolts.

The illustration below shows G.E.C. carriage heaters during installation in the rolling stock of these sets.

The heater is 2 ft. 3 in. long and 5½ in. wide overall at the terminal box end. It weighs 24½ lb.

The manufacturer, the General Electric Co. Ltd., Kingsway, London, W.C.2, is



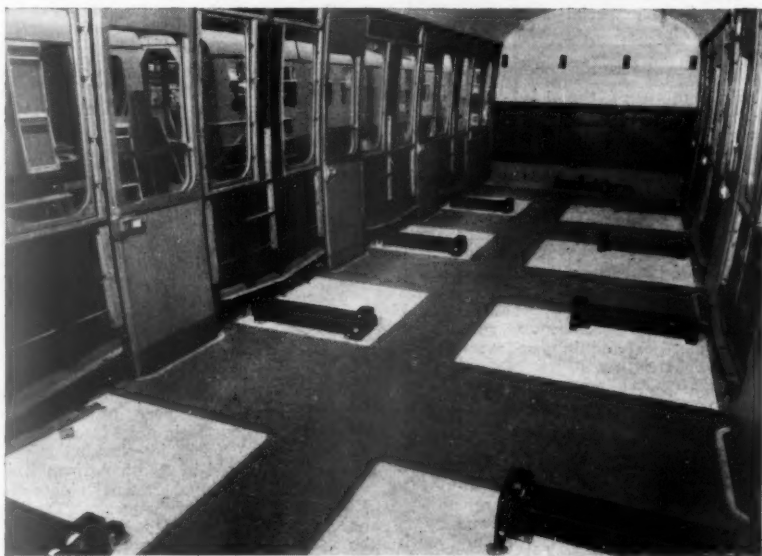
prepared to supply heaters for all systems and voltages and to meet the individual requirements of coachbuilders of road and rail vehicles.

## Concrete Repair Additive

**A**N additive for mixing with concrete, known as Exsud Albitol, has been evolved to overcome the problem of unsatisfactory adhesion when repairing concrete and artificial stone. Applications include the building up of worn or broken surfaces such as facings on R.C. bridges and walls, concrete floors and steps.

Mixed with fresh concrete, the additive makes reliable and permanent repairs; it can be "floated" on to a worn floor surface as thinly as  $\frac{1}{8}$  in. Its resistance to wear is said to be better than plain concrete.

The price of Exsud Albitol is £4 10s. per 22-lb. can, and delivery is 14 days. The manufacturer is the South American Minerals & Products Co. Ltd., 26-27, Cowcross Street, London, E.C.1.



## Metropolitan-Vickers Electrical Co. Ltd. Activities in 1956

### *Traction and signalling equipment for railways at home and overseas*

The capacity of the Metropolitan-Vickers Electrical Co. Ltd. for the manufacture of railway motors and generators is to be doubled by extending the traction motor works at Sheffield at a cost of £2½ million, and increased capacity is being provided for control equipment. This will enable more export business to be undertaken without prejudice to the substantial assistance available for British Railways modernisation plan. Work is at present in hand on electric locomotives, diesel-electric locomotives, and multiple-unit trains, all of which are envisaged in this scheme. Much special equipment is being developed for operation on the new 25-kV. 50-cycle single-phase a.c. system adopted by the British Transport Commission.

Overseas, electric traction equipment for urban transport is being supplied to some large cities; main-line locomotives have been despatched to Ireland, Western Australia, and New South Wales, and nearly 200 will be in service in those countries by the end of 1957; and M-V.—G.R.S. signalling equipment has been installed on main lines and marshalling yards from Scotland to Rhodesia.

New types of traction equipment are being developed to suit the 25-kV. 50-cycle single-phase system adopted by British Railways. These include rectifiers, transformers, on-load tap changers, and switch-gear for mounting in electric locomotives and motor coaches, and also signalling apparatus.

The single-anode constantly-excited mercury arc rectifier known as an "excitron" is now in production; special features of the M-V. design are the low overall height, which is less than 28 in. and permits underframe mounting, and the use of the ignition method of ignition, which dispenses with any moving parts in the system. The rectifier transformer will be fitted with 25-kV. on-load tap-changing equipment to control the voltage to the traction motors under varying conditions of starting and running; the tap changer is designed to suit the limited space available and other special conditions of railway working.

#### **Diesel-Electric Locomotives**

Eight more of the 1,105-h.p. 77½-ton 2-Do-2 diesel-electric locomotives have been shipped to Western Australia, thus completing the order for 48 locomotives for the Government Railways.

A large number of M-V. locomotives are now in service with Coras Iompair Eireann; all 60 of the 1,200-h.p. 85-ton Co-Co locomotives have been despatched to Dublin, and shipments are about to commence on the 34 550-h.p. 58-ton Bo-Bo locomotives in hand. Ten out of 12 Sulzer-engined locomotives fitted with M-V. electrical equipment are also in service in Ireland.

Design work is proceeding on 20 1,200-h.p. Co-Bo 90-ton locomotives on order for British Railways.

Thirty-five of the 50 1,280-h.p. 3,000-V. d.c. three-coach train units for the Central Railway of Brazil have been shipped to Rio de Janeiro, and most are now in service. They are being followed by 50 motor coaches and the electrical and mechanical equipment for a hundred trailer

cars, which with other gear will complete this £7,000,000 order.

Almost all of the 24 sets of 600-V. d.c. electrical equipment being supplied for the Mersey lines of British Railways are now in service. Several of the 80 1,500-V. d.c. motor coach equipments for the New South Wales Government Railways are being erected in Sydney. A large number of 3,000-V. d.c. equipments are also in hand; design work is practically complete on two large orders—111 motor coach and 244 trailer equipments for the South African Railways, and 34 motor coach and 68 trailer sets for the Calcutta suburban electrification.

An experimental 25-kV. 50-cycle a.c. equipment has been built for testing on the Lancaster-Morecambe-Heysham electrified line of British Railways and is now being erected in the motor coach; this includes four of the "excitron" rectifiers mentioned above, with rectifier transformers and on-load tap-changing equipment.

#### **Electric Locomotives**

Twenty-four of the 40 3,820-h.p. 108-ton Co-Co electric locomotives for the New South Wales Government Railways have been completed at the Stockton Works of Metropolitan-Vickers—Beyer, Peacock; fifteen of them are now in service on the 1,500-V. d.c. main line electrification from Sydney to Lithgow in the Blue Mountains, these being the most powerful electric locomotives made by a British manufacturer.

Electrical equipment has been despatched for two shunting locomotives being built in Holland by Werkespoor for New Consolidated Goldfields. Nine 2,500-h.p. locomotives with M-V. electrical equipment are now in service with the Polish Coal Mines Administration.

Fifty-eight sets of rheostatic braking equipment are being supplied for the mixed-traffic locomotives equipped some years ago for the Manchester-Sheffield-Wath electrification of British Railways, and h.v. cab-heating equipment is being supplied for these and for seven high-speed passenger locomotives.

#### **Signalling**

For the new mechanised marshalling yard at Thornton, in East Fife, M-V.—G.R.S. supplied the retarders and automatic point equipment. The yard is the first in this country to use fully automatic braking of wagons and electronic methods of speed measurement; it is the forerunner of many more to be designed by British Railways. Automatic or manual control of both the retarders and points is provided, and all control switches for these and for the signalling are combined on one panel.

A large type "NX" signalling plant involving one large and one small control panel at adjacent stations is being installed at Temple Mills, Eastern Region.

Two large installations of centralised traffic control have been ordered from Rhodesia as reported in our March 1 issue. Three type "NX" interlocking plants have been ordered by South African Railways for installation between Knights and Kempton Park near Johannesburg, and in one of these Syncrostep equipment will be used for a small remote interlocking. The first small power signalling installa-

tion has been ordered by the Pakistan Railways.

A first installation of power-operated road crossing barriers has been put into service at a steelworks in this country.

For the A.T.C. system to be used on British Railways a large number of track inductors have been made and installed on the trial section between Kings Cross and Grantham; other devices are being developed for this system in conjunction with the railway engineers.

A new line of relays, type "AS," has been developed and is now in production; this relay, which is of the plug-in type, very similar to the well-known type "B" range and with all its plugboard facilities, follows the modern trend towards "miniaturisation." The application of electronic devices on which development work has been proceeding during the year is to be extended.

Signalling apparatus is being developed in co-operation with British Railways engineers for use on their 25-kV. single-phase 50-cycle a.c. electrifications.

### **More Ten-Car Electric Trains in Southern Region**

As part of the modernisation plan, Platforms 1 to 5 at Cannon Street, Southern Region, have been lengthened, and ten-car multiple-unit electric trains were introduced last Monday on the lines serving Bexleyheath, Woolwich, the Dartford Loop, the Mid-Kent Line to Hayes, Bromley North, and Sevenoaks. Between 7 a.m. and 10 a.m., 22 of these longer trains will arrive at Cannon Street, and 23 leave in the evening between 4 p.m. and 8 p.m. The ten-car trains take the place of eight-car trains and provide a 25 per cent increase in seating capacity.

From March 4 also Charing Cross Station is being used to a greater extent for ten-car trains, there being 46 in the morning business period and 40 in the evening.

#### **Further Increase in Summer**

With the introduction of the summer service on June 17 the number of ten-car trains in and out of Cannon Street will be increased from 22 to 45 in the morning and 23 to 42 in the evening, and the 68,000 passengers who use the station in the business period will then get a total of 16,000 extra seats. More ten-car trains will be introduced from June 17 at Charing Cross Station. In the morning they will be increased to 55 and in the evening to 58, bringing an increase in seating accommodation of 4,650 for the inward journey and 6,500 at night.

### **Colour-Light Signalling at Perth**

The contract recently awarded by the Scottish Region to the Siemens & General Electric Railway Signal Co. Ltd. (see our February 15 issue, pages 177 and 205) for signalling at Perth covers colour-light signalling and electro-pneumatic operation of points at Perth General Station and extending over some nine miles of the main line. A route-relay interlocking installation operating over 400 routes will enable the work of 13 existing signal cabins to be centralised in a new cabin south of the station, which will control the main line from Stanley Junction to Hilton Junction, respectively north and south of Perth, and the line to Dundee as far as Barnhill, a little over a mile from the General station. Routes will be set up by operating key



switches corresponding to the beginning and end of each, and mounted in the appropriate positions on the track diagram. The main items of signalling equipment to be supplied include multi-aspect colour-light signals, electro-pneumatic point machines equipped with ground track locks and complete with air control units, position-light shunt and subsidiary signals, and a.c. vane type track relays. The contract also covers compressor plant, diesel-driven standby power equipment, cables and cable routes and air main equipment.

## Parliamentary Notes

### Closing of Branch Lines

Mr. John Baldock (Harborough—C.) raised in a brief debate in the House of Commons on February 27 the question of the closing of branch lines and the withdrawal of bus services. On the question of branch lines which had been closed, or which were being kept open for goods only, many suggestions had been made in the House about the increased use of diesel cars. He was glad to hear that some progress had been made with these railcars. The results obtained from putting them into service appeared to be very encouraging. He saw a figure concerning the Buckingham-Banbury branch line on which a single diesel unit was put into operation. As a result, the increase in traffic was no less than 434 per cent.

"That is the kind of figure which justifies the pressure which some of us have been trying to exert in an attempt to have these experiments carried out," commented Mr. Baldock. "I am still not convinced that we have broken down the resistance of the railways to trying out the really light bus type of vehicle which runs on rubber-tyre wheels. These vehicles are operated by one man, who drives and collects the tickets. There is no station staff, only a halt. They reduce the cost of a passenger service enormously, and they are running quite successfully in Germany, Ireland, and, I believe, several other countries."

He still felt that British Railways had a very closed mind about this ultra-light type of rail car. The ones which British Railways had built were excellent vehicles, solid and heavy, and would, no doubt, last generations. But he still thought that the railways could successfully use this very light type of quite cheap vehicle on some of the lines with the lightest loads.

Mr. Ernest Popplewell (Newcastle-upon-Tyne—Lab.) said that branch railway lines had not been closed until there had been full investigation by the transport users' consultative committees of the proposals to close them. The B.T.C. had had to establish a case for closing them. The Commission had attempted to assist the rural areas by granting subsidies to private bus owners as alternative transport to the branch line services. Private bus owners had accepted such offers, but, shortly after, had taken their buses out of service.

Mr. G. R. H. Nugent, Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation, said the problem of rural transport could not be solved easily; it was a continuing one. The Ministry had no precise figures because the officials in the regional traffic commissioners' offices had been completely employed in dealing with the fuel rationing in recent months, and it had been impossible to correlate the figures.

There might well have been a continuing reduction in rural services, both road and

rail, but he pointed out that bus services could not be withdrawn without the agreement of the traffic commissioner. If he thought they could bear additional unremunerative services he was very stiff with them. Something like 40-50 per cent of these rural services were unremunerative.

Mr. Nugent asked Mr. Baldock to recognise the absolute necessity to protect existing services from erosion, from a creaming of traffic, which would make more and more of their services unremunerative and, possibly, finally, put them in danger of destruction altogether.

## Questions in Parliament

### Diversion of Coal to Rail

Major Sir William Anstruther-Gray (Berwickshire & East Lothian—U.), asked the Paymaster General on February 25 what further progress he could now report in the diversion of coal transport from road to rail.

Mr. Reginald Maudling, in a written reply: The National Coal Board reports a slight fall to a weekly rate of 57,000 tons. This was due to a local shortage of railway wagons, which the Minister of Transport informs me was only temporary.

### Railway Purchases in Europe

Lt-Colonel Bromley-Davenport (Knutsford—C.) asked the President of the Board of Trade on February 27 whether, in the proposed free trade area, major nationalised undertakings, such as electricity, gas, and railways, would be permitted complete freedom to purchase their supplies from any country within the proposed free trade area.

Sir David Eccles: Detailed negotiations have not yet begun, and I cannot at this stage forecast how the provisions of a convention to establish the free trade area may affect the existing practices in this regard of the countries that become parties to it.

### Diesel Services

Mr. Roy Mason (Barnsley—Lab.) asked the Minister of Transport & Civil Aviation on February 27 to what extent the modernisation of British Railways had been affected by the fuel shortage, particularly the dieselisation of branch lines; and to what extent the diesel service planned to operate this year between Barnsley and Leeds had been affected.

Mr. Harold Watkinson, in a written reply: The effect has been to restrict the introduction of new diesel services to urgent requirements. There is at present no scheme for diesel working between Barnsley and Leeds, but other new diesel services have been or will be introduced in the West Riding this year as planned.

### Railway Bridge Conversion

Mr. M. Price Philips (Gloucestershire W.—Lab.) asked the Minister of Transport & Civil Aviation on February 27 whether, in view of the postponement of the Severn Bridge and the congestion of traffic at Chepstow, he would consult with the B.T.C. with a view to converting the present railway bridge at Sharpness to enable it to take road as well as rail traffic; and whether he would also consider a by-pass road round Chepstow, crossing the Wye by a Bailey bridge.

Mr. Harold Watkinson: Proposals for the conversion of the existing railway bridge at Sharpness, to enable it to carry road as well as rail traffic, were considered carefully, in consultation with the B.T.C. some years ago and were also examined

afresh early last year. Only extremely restricted road use would be possible, which would not justify the very considerable expenditure involved.

A by-pass of Chepstow he stated, would be a very expensive project. He could not fit it into the early years of the road programme.

## Staff & Labour Matters

### N.U.R. Wage Claim

The hearing of the N.U.R. claim for a 10 per cent increase in the rates of pay of railway salaried and conciliation staff before the Railway Staff National Tribunal concluded on February 27.

On the last day of the hearing Mr. J. Campbell, General Secretary of the union, summed up for the N.U.R. and expressed views on a number of points which had been referred to by Mr. A. B. B. Valentine, Member of the B.T.C., who represented that body. Dealing with the cost of living, he emphasised that the lower-paid workers on the railways had to spend a higher percentage of their income on food than was represented by the official weighting of 35 per cent in the "Index of Retail Prices." He maintained that this argument was well reinforced by the budgets of household expenditure which he had quoted as evidence.

Mr. Valentine stated that the settlement which had been reached in January, 1956, and which represented an increase of 7 per cent on basic rates of pay in response to applications from the N.U.R. for a 10 per cent increase and 7½ per cent from the other railway unions had been well received by the unions and the staff, not only because it was a negotiated settlement, but because of the substance of the settlement. He added that when that settlement was made in 1956 there were many other wage claims pending in outside industry and these were bound to be affected to some degree by the railway settlement. Experience showed that wage rates moved in cycles and it was surprising that the N.U.R. could believe that the 7 per cent settlement in connection with railway wage rates would not have its counterpart and repercussions in the wage rates of other industries in the same cycle.

The Award of the Railway Staff National Tribunal is now awaited.

LEYLAND BUSES FOR NETHERLANDS RAILWAYS.—The Netherlands Railway Company has now disclosed the design of its new buses—300 in all with British-built chassis—which it has chosen to replace buses placed in service after the war. Many of these vehicles have already covered more than 1,000,000 km. All the 300 new buses will be based on Worldmaster export bus chassis supplied by Leyland Motors Limited, the specification including 125-h.p. horizontal diesel engine, fluid coupling, and four-speed semi-automatic Pneumocyclic gearbox. Air brakes, with a separate system for each axle, will be used. The buses will be of two standard patterns designed by the railways. One type will have a single entrance and exit door at the front with a coach seating layout of 48 seats all facing forwards, the other type will be a two-door model with seating arranged back-to-back over the wheel arches to carry 45 seated and 25 standing passengers. All will be of integral construction, 130 being produced by Verheul and the rest by Werkspoor and other body-builders not yet nominated.

## Contracts and Tenders

The English Electric Co. Ltd. has received a repeat order from the Spanish National Railways (R.E.N.F.E.) for 15 3,600-h.p., 3,000-V. d.c. electric locomotives. They will be identical to the 60 English Electric locomotives now in operation in the North of Spain. The Vulcan Foundry Limited, of Newton-le-Willows, Lancashire, which built the mechanical parts of the previous 60 locomotives, will also make those for the latest order. The locomotives, each weighing 118 tons, are designed for a track gauge of 5 ft. 6 in. The English Electric Co. Ltd. has also received a repeat order for electrical equipment for the Aviles Steel Works, also in the North of Spain. The value of the locomotive and electrical equipment orders is approximately £1,800,000.

The Siemens & General Electric Railway Signal Co. Ltd. has received a contract from the South African Railways for colour-light signalling and power operation of points on the line which is being doubled and electrified between Dunswart and Alliance, on the eastern outskirts of Johannesburg. Some 10 miles of line are involved, with 60 track circuits, 29 searchlight running signals, and four position-light shunt signals. The complete cabling and distribution system for signalling and power supplies is included in the contract.

British Railways, Eastern Region, have placed the following contracts:—

Shirley Painting & Decorating Service, London, N.4: cleaning and painting of warehouses, goods sheds, offices, staircases, toilets, messrooms, stores, and signals at Kings Cross Goods Yard.

W. & C. French Limited, Buckhurst Hill, Essex: strengthening and repairs to mechanical coaling plant at Stratford, and reconstruction of North abutment and superstructure of underline bridge No. 254 at 69 m. 74 ch. over River Gipping between Ipswich and Bramford.

R. Ridd & Son (Contractors) Ltd., Hornchurch, Essex: cleaning and painting of joiners' shops, saw mill bays, and body shops (internal only) in Carriage and Wagon Engineers' Workshops, at Doncaster.

British Railways, North Eastern Region, have placed the following contracts:—

Modern Paviers Limited, Shipley: road repairs, Hull and York districts.

Lindwell & Co. Ltd., Leamington Spa: provision of steel unit construction building, York.

Mitchell Engineering Limited, Peterborough: new cradle, York Coaling Plant.

R. Blackett & Son Ltd., Darlington: operating store, Darlington Diesel Depot. Charles R. Price, Doncaster: reconstruction of roof, Wakefield Westgate, passenger station.

British Railways, Western Region, have placed the following contracts:—

Moore & Garnham Limited, Wolverhampton: alterations and repairs to be carried out to Bilston Central station buildings, near Wolverhampton.

Shelvoke & Drewry Limited, Letchworth, Herts: supply of 35 model 100 S.D. freightlifters for the Chief Commercial Manager's department.

Standard Telephones & Cables Limited, London, E.16: provision and installation of multi-channel carrier tele-

phone and voice frequency telegraph circuits and the supply loading and jointing of cables between Paddington and Reading.

T. F. Howells Limited, Caerphilly, Glam.: provision of a new booking hall and other work to be carried out at Cardiff (Queen Street) Station.

Chilton Steel Limited, Long Melford, Suffolk: supply and erection of steelwork in connection with the construction of engine shed at Pwllheli, Carnarvonshire.

Robert M. Douglas (Contractors) Limited, Birmingham, 23: diversion of the railway line between 114 m. 55 ch. and 115 m. 38 ch. near Gloucester.

Industrial Engineering Limited, London, W.1: carrying out repairs to the roof glazing over platforms 7 & 9 and 12 & 14 at Bristol (Temple Meads) Station.

Whyatt (Builders) Limited, London, S.W.16: renewal of the railings at Eastbourne Terrace, Paddington.

Dudley Coles Limited, Plymouth, Devon: reconstruction of platform buildings at Plymouth (North Road) Station.

Ransomes & Rapier Limited, Ipswich: supply and supervision of erection of five 65 ft. diameter electrically operated turntables, one each at Stourbridge, Bristol (St. Philips Marsh) and Newport (Ebbw Junction) and two at Tyseley Motive Power Depots.

Wilson Lovatt & Sons Ltd., Wolverhampton: provision of earthworks and the construction of a retaining wall and crossing shop with amenities block at Swindon.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Australia for diesel engines, transmissions and associated equipment including drivers' controls, for installation in suburban multiple-unit diesel railcars of the South Australian Railways. The engines are to develop not less than 210 b.h.p. at 2,100 r.p.m. Tenders are invited for 24 diesel engines, transmissions, and associated equipment, or 28 diesel engines, transmissions, and associated equipment, or individual items of the equipment to the quantities specified.

The issuing authority is the South Australian Railways, Mechanical Branch. The tender No. is C.M.E. 1/57. Bids should be sent to the Secretary, South Australian Railways, Box 1825, G.P.O., Adelaide, South Australia. The closing date is March 21, 1957. A copy of the tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A further copy may be inspected at the office of the Agent General for South Australia in London. The reference E.S.B./4922/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, reports that the Controller of Stores, Sudan Railways, Atbara, has invited tenders for the supply of 60 covered four-wheel goods wagons from manufacturers. Specification, together with drawings giving full particulars of these wagons, can be obtained from the Office of Controller of Stores on application. The closing date fixed for receipt of tender in Atbara is March 20, 1957.

No further information is available at the Board of Trade about this call for tenders. The reference E.S.B. 5135/57 should be quoted in any correspondence with the Branch (Lacon House, Theobalds Road, W.C.1).

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Australia for cast steel freight bogies as follows:—

100 wagon sets of cast steel bogies for Victorian Railways' "GJ" type freight wagons.

The issuing authority is the Victorian Railways Rolling Stock Branch. The tender No. is 61,114. Bids should be sent to the Secretary for Victorian Railways, Railways Administrative Offices, Melbourne, C.1. The closing date is March 20, 1957. A copy of the tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photocopy set can be purchased from the Branch for 10s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photocopy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference E.S.B./5043/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for railway brake equipment, as follows:—

15,000±25 per cent swan necks 2 in. dia. to IRS, drg. No. VB-318 alt. 4 and to IRS specn. No. R.3.53.

Tenderers are at liberty to quote special reduced rates for orders of larger quantities to be placed during the contract period as larger production would mean reduction in operating cost.

The issuing authority is the Director General of Supplies and Disposals. The tender No. is SRIA/RC/4189/II. Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is March 19, 1957. A set of tender documents, but not drawings or specification, is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photocopy set can be purchased from the Branch for 10s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photocopy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference E.S.B. 4715/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for flue tubes, as follows:—

560 flue tubes, superheater, 5½ in. o/s dia. × 15 ft. 7 in. long × 8 s.w.g., for GS, GSM, HX, HSM, HS, HSG, N, NM, and KS classes (card No. 31/02/0298).

118 flue tubes 5½ in. × 5½ in. × 4½ in. × 4½ in. × 8 s.w.g. × 18 ft. 9½ in. long, for XD class (card No. 31/02/0410).

The issuing authority is the Director General of Supplies and Disposals. The tender No. is P/SW-2/19642-G/IV. Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is March 20, 1957. A set of tender documents and

drawings is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). The reference E.S.B./5076/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for distance blocks as follows:—

2,000 distance blocks C.I. check ordinary bolt jaws taking rails of similar section to C.Rly., drg. No. 31685A/I D.G.S. & D. No. 11996) & IRS. specn. No. T10/56 (class D 69/82 section)

4,000 distance blocks C.I. (intermediate) for use with 90 lb. R main and 60 or 62 lb. FF guard rails to C.Rly., drg. No. 72794.C (D.G.S. & D. No. 13516) & IRS. specn. No. T10/56 (90 lb. RFF section).

2,000 distance blocks C.I. for use with 90 lb. R main and 60 or 62 lb. FF guard rails. RH to C.Rly., drg. No. 72794.C D.G.S. & D. No. 13516) and IRS. specn. No. T10/56 (90 lb. RFF section)

2,000 distance blocks C.I. for use with 90 lb. R main and 60 or 62 lb. FF guard rails. LH to C.Rly., drg. No. 72794.C (D.G.S. & D. No. 13516) and IRS. specn. No. T10/56 (90 lb. RFF section)

The issuing authority is the Director General of Supplies and Disposals. The tender No. is SR2/18942-G/I. Bids should be sent to the Director General of Supplies & Disposals, Shahjahan Road, New Delhi. The closing date is March 21, 1957. A set of tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 17s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference E.S.B./4678/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from South Africa for switches as follows:—

454 track section switches to S.A.R. specification ENW. 55/60/1

203 isolating switches to S.A.R. specification ENW. 55/60/2

#### Alternatively

203 isolating switches as above but with a time delay arrangement on the operating mechanism, as detailed under "Service" of S.A.R. specification ENW. 55/60/2

The issuing authority is the Stores Department, South African Railways. Bids, in sealed envelopes, endorsed "Tender No. C.6378 Switches," should be addressed to the Chairman of the Tender Board, South African Railways, P.O. Box 7784, Johannesburg. The closing date is March 29, 1957.

A copy of the tender documents including specifications is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 11s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The attention of firms is drawn to the fact that because of the present import restrictions the South

African Import Control will not issue an import permit if there is any possibility of obtaining the goods required locally, either from local manufacturers or from overseas manufacturers ex locally held stocks. Where invitations to tender are extended overseas the issue of an import permit will be considered but will not automatically be granted. If an overseas firm is successful, the import permit will be issued, but if a local offer is made, it can be accepted without committing the Administration to the issue of replacement permits. The reference E.S.B. 4381/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for sleeper keys, as follows:—

15,000 keys (left) M.S. for trough sleepers for 90 lb. F.B. rails

The issuing authority is the Director General of Supplies and Disposals. The tender No. is P/SR2/19579-G/II. Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is March 26, 1957. A set of tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). The reference E.S.B./5077/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for point operating equipment, as follows:—

20 lever boxes, N.G. complete with connecting rods and H.D. bolts

480 pressed brackets M.S. without bolts and nuts

132 point levers, C.I. tumbler type, complete except for pull rods

96 pullover rods, for "Williams" type B point levers and for stretcher bars

The issuing authority is the Director General of Supplies and Disposals. The tender No. is SR2/19518-G/III. Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is March 21, 1957. A set of tender documents, excluding specifications, is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 16s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference E.S.B./5075/57 should be quoted in any correspondence with the Branch.

**INCREASE IN OVERSEAS VISITORS.**—The British Travel & Holidays Association reports that the British tourist industry "broke all records in 1956." About 1,100,000 overseas visitors are estimated to have come to the country last year, earnings from this traffic, including fare payments to British shipping and air lines, being estimated at £175 million. Visitors from the U.S.A. numbered about 275,000 and their expenditure, including fare payments, totalled £48 million. In 1955, Britain attracted 1,037,000 visitors, about 250,000 of whom came from America. The unsettled international situation is stated to have had little effect upon Britain's late-season tourist traffic.

## Notes and News

**Assistant Engineers Required.**—Applications are invited for the posts of assistant engineers required by the Railway Department, Sierra Leone. See Official Notices on page 292.

**Vacancy for General Manager and Clerk.**—Applications are invited for the post of general manager and clerk to the River Wear Commissioners at Sunderland. See Official Notices on page 292.

**Sales & Service Engineer Required.**—A sales and service engineer with railway background is required to set up a new department to deal with sales of roller bearing axleboxes of established reputation. See Official Notices on page 292.

**National Coal Board: Vacancy for Traction Engineer.**—The National Coal Board require at its Headquarters Production Department a traction engineer, to undertake a wide range of difficult but interesting traction problems, both on and below ground throughout the coalfields. See Official Notices on page 292.

**Mandalay-Rangoon Mail Train Derailed.**—Reports from Rangoon state that a Mandalay-Rangoon mail train was derailed on March 4 and that more than 30 people were killed. Insurgents are said to have removed bolts and fishplates from a half-mile length of track. As the locomotive left the rails, the coaches telescoped into one another.

**£40 Million Steel Share Offer.**—The Iron & Steel Holding & Realisation Agency announced on March 5 that final arrangements are being made for the offer for sale of 40,000,000 ordinary shares of £1 each in the Steel Company of Wales Limited, at 20s. a share. Applications must be made for a multiple of 50 shares; 5s. per share will be payable on application. A statement said that it was intended that the offer should be advertised on March 11, and that the application list should open at 10 a.m. on March 14, and close the same day. The company hoped to pay an interim dividend of 2½ per cent (less tax) in the autumn of 1957, and a final dividend of 3½ per cent (less tax) early in 1958 for the financial year 1956-57; this would represent a rate of some 8 per cent on the average of the paid up share capital during the current year.

**"The Student Prince."**—"The Student Prince," the spectacular light opera with music by Sigmund Romberg, was presented by the Great Western Railway (London) Operatic Society at the Scala Theatre, London, on Wednesday, Thursday, Friday and Saturday of last week. This opera is admirably suited to the outstanding ability of the cast which numbers over sixty and is composed of members of the clerical staff in the London area of the Western Region of British Railways supported by guest players well known in the amateur theatre. The title role was played admirably by John Harrap; the interpretations of Kathie by Vivien Barrett, Princess Margaret by Jane Munday and the Grand Duchess Anastasia by Dorothy Lees were all of a high standard. Comedy was provided by Ronald Ratcliffe as Lutz, the Prince's personal attendant, Charles Cracknell as Hubert, Lutz's personal attendant, and Vicky Cuthbert as Gretchen. Doctor Engel, the Prince's tutor, was played by Frederick Shearing and the roles of the three leading Students—



Detleff, Lucas and Von Asterberg—by Walter Jenkins, William Anderson and John Pomeroy. Other principal players included James Lightfoot, Frederick Toon, Harry Rossiter and Baden Hawes as Toni, Count Von Mark, Ruder and Captain Tarnitz. Alison Maclaren, who was responsible for the production, is to be congratulated on another fine performance. The orchestra was under the direction of Stanley Cheffins who took over at short notice because of the indisposition of Albert Steward, and did much to make the performance so successful.

**Hamburger Bar at Waterloo.**—A small hamburger bar, known as the "Wimpey," was opened recently in the corner of the refreshment room at Waterloo Station, Southern Region. The bar, decorated in bright colours, specialises in hot hamburgers and freshly-made coffee and has already become very popular.

**Road Casualties in January.**—Road casualty figures for January show a decrease in the total of 3,788, or about one-fifth, compared with January of last year. Deaths numbered 414, a drop of 51; and the seriously injured 3,917, a drop of 731. There was a decrease of 3,006 in the cases of slight injury, which numbered 11,802, making a total for all casualties of 16,133. The decrease in the total is about the same as in December and seems to reflect the fall in traffic since fuel rationing started.

**Huddersfield Technical College.**—A special course of six lectures on electric and diesel railway traction will be held on Tuesdays at 6.45 p.m., in room 14 in the main building of Huddersfield Technical College, the first lecture being on March 12. These lectures are suitable for electrical engineers of Higher National Certificate and Diploma standard, and for those with a similar knowledge of electrical circuits, for example, Final City and Guilds Certificates.

**Eastern Area Board Visit to Sheffield.**—Sir Reginald Wilson, Chairman, and other Members of the Eastern Area Board,

British Transport Commission, recently paid a visit of inspection to Sheffield. The illustration below shows the party at Norfolk Park Road Depot: (left to right): Mr. A. J. White, Assistant General Manager, British Railways, Eastern Region; Mr. Henry Willink, Board Member; Sir Reginald Wilson; and Mr. J. Don, District Road Motor Engineer, Sheffield.

**Train Ferry to be Broken Up.**—The 40-year-old Harwich-Zeebrugge train-ferry vessel *Essex Ferry II* is to be broken up at Grays, Essex.

**British Railways London Midland Region Dramatic Society.**—The next production of the London Midland Region Dramatic Society will be on March 14, 15, and 16 at the Rudolf Steiner Theatre. The play to be presented is a new three-act play written by a British Railways railwayman, Allen Montgomery, of Euston. Called "The Hedgerow," the action of the play takes place in Medieval Europe and has been entered in the British Drama League Festival of original full length plays.

**Western Region Women's First Aid Competition.**—The Western Region Women's First Aid Competition was held at Old Oak Common Hostel, London, on February 20. Dr. C. T. Newnham, London, was the adjudicator in the team test, and Dr. C. J. P. Seccombe, Southall, in the individual tests. The subsequent proceedings were presided over by Mr. S. G. Hearn, Chief Operating Superintendent, and trophies and prizes were presented by Mrs. Hearn. Mr. Hearn was supported by Messrs. R. Burgoyne, Regional Establishment & Staff Officer; R. A. Smeddle, Chief Mechanical & Electrical Engineer; S. G. Ward, Assistant Regional Establishment & Staff Officer; and J. A. Martin, Regional Ambulance Secretary. The Newton Abbot team, winners of the Class 1 competition, with 311½ marks out of 400, qualified to compete in the British Railways, Docks & London Transport (Railways) Competition for Women, arranged by the St. John

Ambulance Association at the Central Hall, Westminster, S.W.1, on June 5; Cardiff "A" were second, with 308 marks. In the Class 2 competition, South Wales Docks "A" was the winning team, with 290 marks, and Cardiff "B" was second, with 288½ out of 400.

**A.B.C. Coupler & Engineering Co. Ltd. Dividend.**—The recommended ordinary dividend of A.B.C. Coupler & Engineering Co. Ltd. for the year ended September 30 last is 20 per cent, as in the previous year. Group profits for the year were £52,402 against £67,236 for 1954-55, after tax of £57,030 (£62,529) and including a special credit of £3,354 (nil).

**Wanton Placing of Obstructions on Railway Lines.**—Two men were sent to prison for three years by Mr. Justice Donovan at Essex Assizes for offences which he described as "diabolical." They had placed a baulk of timber across a railway line, damaged the lamps of a railway caution board, and damaged two signals on the Eastern Region of British Railways in Essex. Two other men were each sentenced to 18 months' imprisonment. The first two men also pleaded guilty to having obstructed an engine by placing a heavy tree trunk across the line. The tree trunk was struck by a passenger train travelling at 40-45 m.p.h. Fortunately it was caught in the brake mechanism and automatically applied the brakes. The baulk of timber—a railway sleeper—was struck by a passenger train near Pitsea at 30 m.p.h. Neither train was derailed.

**Special Trains for B.I.F.**—British Railways, London Midland Region, are to run a special restaurant-car train from Euston each weekday on May 6-17, 1957, except May 11, for the British Industries Fair. The train will leave at 8.37 a.m., arriving at Castle Bromwich at 11 a.m. and returning at 5.10 p.m. to arrive at Euston at 7.48 p.m. Return fares will be 54s. 10d. first class and 36s. 6d. second class. Meals will be provided, breakfasts at 6s. 6d., and light refreshments will be served on the outward journey. Because of the early return time high tea will be provided at 6s. 6d. on the return trains from Castle Bromwich. There will be a typist/linguist on the special trains to assist passengers as required. Seats, at a fee of 1s. a seat per journey outward and return, can be booked in advance at Euston or London agencies, town offices, and suburban stations.

**Sabotage on G.N.R. (I).**—At about 3 a.m. on March 2, armed men signalled, by detonators and a red lamp, the 9.30 p.m. freight train from Enniskillen to Londonderry to a stop at Porthall, where the Great Northern Railway Board line between Strabane and Londonderry runs through part of Co. Donegal (in the Republic of Ireland). The crew was taken from the train and the raiders, reported to be members of the Irish Republican Army, drove it forward. The signalman at St. Johnston, four miles further on, was suspicious of the manner in which the train staffs were exchanged and immediately contacted the signalman at Derry South box, who put his signals against the train. The train ran through the signals and the signalman noticed there were no men on the footplate. It was turned into the arrival platform at the G.N.R. passenger station at Londonderry, where it would do least damage. The train, with 27 wagons, struck the buffers at more than 20 m.p.h., damaging the engine extensively, tele-



Sir Reginald Wilson on a visit of inspection to Norfolk Park Road Depot, Sheffield, Eastern Region

scoping seven wagons, and damaging more. A substitute road passenger service ran while the line was examined, and normal services were resumed at 8 a.m.

#### International Railways of Central America.

—The directors of International Railways of Central America have authorised the call for redemption for the sinking fund on May 1, 1957, of the entire outstanding balance held by the public of its first mortgage 60-year 5 per cent gold bonds and the 5 per cent first mortgage 60-year gold bonds.

**Steel Production in January.**—Steel production in January, 1957, was at the rate of 415,900 tons a week. This was 10,000 tons a week more than in January of last year. Pig iron output was at the rate of 256,900 tons compared with 260,700 tons last year. The fall in pig iron output was mainly because of a temporary closure of a large blast furnace in South Wales for repairs. Steel output was also affected. This furnace will be back in production shortly.

#### Associated Commercial Vehicles Limited.

—The directors of Associated Commercial Vehicles Limited announce that underwriting is now in progress in connection with the issue of  $3\frac{1}{2}$  per cent unsecured loan stock, 1977/82, which the company is offering at £97 per cent to its preference shareholders and ordinary stockholders on the register at the close of business on February 1. The issue is being underwritten by Erlangers Limited.

#### Institute of Transport Dinner in Belfast.

The annual dinner of the Northern Ireland Section of the Institute of Transport was held in Belfast Castle on February 21. The Chairman of the Section, Mr. A. McCleery, presided and the Guest of Honour was the President of the Institute, Mr. F. H. Cave. The Lord Mayor of Belfast, said that until the debt which had saddled all transport in Northern Ireland was liquidated, transport had no future as a paying economic concern in the Province. Proposing the toast, "The Institute of Transport," Professor C. F. Carter said transport seemed to suffer from the inability of the public to decide if it was a public service or not. The President advised a close study of the inter-relationships of transport on an economic level. The Institute was arranging for readerships and two research fellowships to be set up in one of the older English Universities, and it would not be long, he felt, before this idea would spread to other Universities throughout the country. Replying to the toast of "Our Guests," Mr. F. H. Robertson, Chief Project Designer, Short Bros. & Harland Limited, said that for cheap, short-range land travel, he believed that the overhead mono-railway was the right answer.

#### Rebuilt British Railways Overseas Freight Office.

—The Architect of the London Midland Region, working under the Chief Civil Engineer, Mr. J. Taylor Thompson, recently replanned, and the contractors, William Mason & Sons Ltd., of Leeds, completed the rebuilding of the interior of the British Railways Overseas Freight Office at 44-46, Leadenhall Street, London, E.C. In many respects the operation was an architectural achievement because, in view of the importance of the drive for the development of export traffic by rail, the office had to be planned and completed within six weeks. There were also difficulties caused by the irregular shape of

the building and limited space available. The job was completed within the time limit. The decorations comprise light and dark blues and greens, three shades of red, also black and white, all colours blending with veneered timber, and giving a nautical atmosphere. The suspended ceiling is of louvred metal painted white; the floor is asbestos based Vinyl tiles on ply sub-floor; the walls are of veneered sycamore coloured plastic fabric and enamelled panels. The fixed furniture is slightly smaller than standard. Lighting is by eight rows of "warm-white" fluorescent tubes at 2-ft. centres with a line of 19 tungsten filament fittings to give sparkle to showcases containing models.

**Gloucester Railway Carriage & Wagon Co. Ltd.**—An unchanged interim ordinary dividend of 5 per cent is announced by the Gloucester Railway Carriage & Wagon Co. Ltd. A final of 5 per cent was paid for the year ended May 31, 1956.

#### Standard Permanent Speed Sign Adopted.

—British Railways are to adopt as standard the ex-L.N.E.R. type of sign with metal cut-out figures, as an aid to drivers to indicate the commencing point of permanent speed restrictions. Some 11,250 signs will be needed. Their general introduction is expected to prove of considerable value in view of the higher speeds to be achieved under the modernisation plan. The existing methods of indicating temporary speed restrictions for engineering purposes are not affected by this arrangement.

#### Clifton Hall Tunnel to be Filled In.

Clifton Hall double-line tunnel, in the London Midland Region, which on April 28, 1953, was completely blocked by a subsidence in an old constructional shaft, is to be filled in. The subsidence caused the collapse of houses built over the shaft, with the death of five persons. A summary of the Ministry of Transport report on this accident appeared in our issue of May 7, 1954. The tunnel, opened in 1850, is 1,299 yd. long and is on a short branch linking the former L.N.W.R. line from Manchester to Liverpool with the former L.Y.R. line from Manchester Victoria to Bury. The branch terminals are Patricroft and Molyneux Junction at

the L.N.W.R. and L.Y.R. ends respectively. Arrangements have been made to divert the few freight trains that would otherwise have passed over the line. No passenger trains have used the branch since 1939.

## Forthcoming Meetings

Open currently and until further notice.—British Transport Commission: Historical Exhibition "Transport Treasures" in Shareholders' Meeting Room, Euston Station, from 10 a.m. to 6 p.m. on weekdays, and 2 to 6 p.m. on Sundays. Admission 6d.

March 11 (Mon.).—Institute of Transport, at the Jarvis Hall (R.I.B.A.), 66, Portland Place, London, W.1., at 5.45 p.m. Paper on "Railway freight charges," by Mr. A. A. Harrison.

March 12 (Tue.).—Institute of Transport, Yorkshire Section, at the Great Northern Hotel, Wellington Street, Leeds, 1., at 6.30 p.m. Paper on "Railway Salesmanship," by Mr. E. W. Arkle.

March 13 (Wed.).—Institution of Railway Signal Engineers, York Section, at the Signalling School, Toft Green, York, at 5.30 p.m. Paper on "Planning and installation of major signalling schemes," by Mr. G. S. Wilkinson.

March 14 (Thu.).—Institution of Electrical Engineers, at Savoy Place, London, W.C.2., at 5.30 p.m. Paper on "Electrical equipment for rectifier locomotives," by Messrs. H. B. Calverley, E. A. Jarvis, and E. Williams, and paper on "Circuit calculations for rectifier locomotives and motor coaches," by Messrs. J. E. Calverley and D. G. Taylor, combined meeting with the Institution of Locomotive Engineers.

March 14 (Thu.).—Stephenson Locomotive Society, Midland Area, at the Strand Hotel, Bristol, at 7.30 p.m. Paper on "Class 8 express locomotive trials and their sequence," by Mr. O. S. Nock.

March 14 (Thu.).—Institute of Transport, East Midlands Section, at Franklin's Gardens Hotel, Northampton, at



Main office in the rebuilt premises of the British Railways Overseas Freight Office in Leadenhall Street, London, E.C., showing lighting and décor

- 1 p.m. Paper on "Transportation and distribution of petroleum," by a representative of Shell-Mex and B.P. Limited.
- March 14 (Thu.).—Institute of Transport, Scottish Region, at the City Transport Offices, Glasgow, at 5.30 for 6 p.m. Paper on "The staff problem in transport," by Mr. A. Bull.
- March 15 (Fri.).—Mansion House Association, at the Trocadero Restaurant, Piccadilly Circus, S.W.1., at 12.15 for 12.45 p.m. Annual luncheon.
- March 15 (Fri.).—Institute of Transport, at the Dorchester Hotel, Park Lane, London, W.1., annual dinner.
- March 15 (Fri.).—Stephenson Locomotive Society, at Caxton Hall, Westminster, London, S.W.1., at 6.30 p.m. Illustrated lecture "My favourite locomotive type—2-4-0," by Mr. J. E. Kite.
- March 15 (Fri.).—Institute of Transport, South Western Section, at the Great Western Hotel, Exeter, at 12.45 p.m. Paper on "1984" by Mr. J. W. Dedman.
- March 16 (Sat.).—Permanent Way Institution, Manchester & Liverpool Section, at Liverpool, at 2.30 p.m. Lantern slides: "1956 Convention at Folkestone," "Folkestone Warren Loadslips," and "Recent developments in permanent way design."
- March 16 (Sat.).—Permanent Way Institution, East Anglia Section, at Cambridge, at 2.15 p.m. "First aid on the job," Messrs. G. W. Baker, A. J. W. Dye, S. A. Lethbridge, Mr. F. Noctor, and R. G. Balls.
- March 16 (Sat.).—Railway Correspondence & Travel Society, Lancashire & North-West Branch, at All Saints' Rectory, Droylsden, Manchester 10, at 6.30 p.m. Paper on "The very last days of steam in Ireland," by Messrs. D. S. Smith and J. F. Oxley.
- March 16 (Sat.).—Railway Correspondence & Travel Society, South of England Branch, at the Bournemouth Corporation Employees' Club Room, Palmerston Road, Boscombe, at 6.30 p.m. Paper on "The A4 locomotives of the L.N.E.R.," by Mr. G. O. Pearce.
- March 16 (Sat.).—Stephenson Locomotive Society, North Eastern Section, at the Griffin Hotel, Leeds, at 6.30 p.m. Paper on "Footplate experiences at home and abroad," by Mr. P. W. B. Lemmens.
- March 19 (Tue.).—Institution of Railway Signal Engineers, London Section, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2., at 6 p.m. Paper on "Automatic operation of marshalling yards," by Mr. D. C. Webb.
- March 22 (Fri.).—R.O.D. Officers' Reunion Dinner, at the Transportation Club, 44, Wilton Crescent, London, S.W.1., at 6.30 for 7 p.m.

## Railway Stock Market

Although the impending offer of 40,000,000 shares in the Steel Company of Wales monopolised attention, a fair volume of business took place in stock markets, but profit-taking predominated in some sections. The gold and dollar reserve figures for the past month were better than expected, and firmness in British Funds was attributed to the growing view in the City that the Bank rate may be reduced further to 4½ per cent before the Budget.

A feature among railway stocks has been a sharp advance in White Pass from \$18½ a week ago to \$21½ on attention drawn to the promising outlook for the railway, whose earnings should increase substantially as time proceeds. White Pass debentures gained 1½ at 76½. The trend of Wall Street markets was also a helpful influence, and was largely responsible for a rally in Canadian Pacifics from \$59½ to \$60½. The 4 per cent preference and debenture stocks have been well maintained at £62½ and £72½ respectively.

Costa Rica ordinary stock receded from 25½ to 24, but elsewhere, International of Central America shares have been marked up from \$32½ to \$37½. Mexican "A" bearer debentures rose from 69½ a week ago to 70½. Paraguay Central prior stock was again quoted at 13½ and Chilean Northern 5 per cent debentures at 44½.

Nitrate Rails and Taltal shares were 22s. and 11s. 6d. respectively. Guayaquil & Quito 5 per cent first debentures were 92. United of Havana second income stock was 8½ and the consolidated stock 2½, while Brazil Railway bonds remained at 6 and San Paulo Railway shares kept at their par value of 3s.

Elsewhere, Antofagasta ordinary and preference stocks have been fairly active around 32 and 46½ respectively.

Among shares of locomotive builders and engineers the best feature was a further advance—from 20s. 6d. a week ago to 22s. 7½.—in Birmingham Wagon, the yield of nearly 8½ per cent on the basis of last year's 10 per cent dividend attracting attention. G. D. Peters, which moved up further from 32s. 6d. to 33s. 9d., remained under the influence of the higher dividend.

Beyer Peacock 45s. 3d. moved higher again, while Charles Roberts 5s. shares at 12s. 3d. also again moved in favour of holders. Westinghouse Brake at 81s. 6d. gained 1s. 6d. on balance, and Consolidated Signal shares rose from 36s. 6d. to 37s. 6d. Wagon Repairs 5s. shares were 13s. 3d. and Gloucester Wagon 10s. shares 14s. Leyland Motors strengthened to 46s., helped by the chairman's review which included a reference to British United Traction Ltd. (B.U.T.), the company jointly owned by Leyland and A.E.C. Cammell Laird 5s. shares have been firm at 12s. 7½d. and Vickers further strengthened from 43s. 7½d. a week ago to 44s. 10½d.

Elsewhere, T. W. Ward were good at 70s. 6d. but after 49s., Guest Keen eased to 48s. 6d. W. G. Allen 5s. shares kept at 7s. and Central Wagon 10s. shares moved up from 18s. 3d. to 19s. English Electric have been prominent with a fresh rise from 56s. 9d. to 59s. 3d. on further consideration of the past year's results. In fact, electrical equipment shares generally were good on wider recognition of the important part electrical equipment companies are playing in the development of A-power plants. General Electric strengthened to 57s. but Associated Electrical at 64s. 6d. moved slightly lower as compared with a week ago, the sharp fall in profits for the past financial years having been larger than expected. Nevertheless, the profit fall was due to special and non-recurring factors, including internal adjustments, benefits from which are now accruing. British Oxygen shares were firmer at 33s. 9d. following publication of the report and accounts which disclose a very strong position. Tube Investments were 59s. 4½d., Babcock & Wilcox 82s. 6d. and Clarke Chapman at 140s. held almost all their recent good rise. Ruston & Hornsby have been steady at 33s. 6d.

## OFFICIAL NOTICES

**DRAUGHTSMEN.** Civil Engineering, with experience of railway work wanted for Consulting Engineers' Office in Westminster. 5-day week. Contributory Pension Scheme. Progressive positions. Apply with full particulars of age and experience to Box No. 718, c/o Charles Barker & Sons Ltd., Gateway House, London, E.C.4.

**SALES AND SERVICE ENGINEER** with Railway background required to set up a new department to deal with sales of Roller Bearing Axle Boxes of established reputation. Applicants should submit full details of their education and previous Railway background. Box 264, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

**DESIGN ENGINEER** required to lead a team of Engineers engaged on the development and application of accessories to the Railway and General Transport Industries. Applicants should have a practical Railway engineering background and possess qualifications and qualities compatible with a Senior appointment. Box 254, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

**ASSISTANT ENGINEERS.** Railway Department Sierra Leone.—Appointments can be either to the permanent and pensionable establishment in the salary scale £1,006—£1,652 gross including expatriation pay or on contract gratuity terms with gross emoluments in scale £1,262—£2,063 p.a. plus gratuity of £150 p.a. Free passages. Free medical attention for officer. Generous home leave. Low Income Tax. Candidates should hold a University degree or diploma recognised as exemption from or have passed Final Parts I and II of the A.M.I.C.E. examination and have had good general training and experience of Civil Engineering. Apply Director of Recruitment, Colonial Office, London, S.W.1. Give details of age, qualifications and experience. Quote BCD 110/15/08/D15.

**TRACTION ENGINEER** required by N.C.B.'s H.Q. Production Dept., to undertake a wide range of difficult but interesting traction problems, both on and below ground throughout the coalfields. Good technical qualifications, considerable experience with diesel and/or electric traction, and ability to carry out responsible work on traction projects are all essential. The post is located at Stanhope Bretby, near Burton-on-Trent. Appointment (superannuable) within range £1,122 to £1,650 male, according to qualifications and experience. Write, with full particulars of age, education, qualifications and experience to National Coal Board, Staff Dept., Hobart House, London, S.W.1, marking envelope X/629/E, before 4th April, 1957.

**THE River Wear Commissioners Port of Sunderland.**—Applications are invited for the post of **GENERAL MANAGER AND CLERK** to the River Wear Commissioners at Sunderland. The salary will depend upon the qualifications and experience of the successful applicant, but will not be less than £2,250 per annum. The post is a designated post under the Local Government Superannuation Acts. The appointment entails responsibility to the Commissioners for the general administration of their Undertaking, and the working of the Port including management of the Sunderland Corporation Quay. Experience in the commercial field of Port activities is essential and experience in Trust Operated Ports would be an advantage. Applications giving full details of age, education, qualifications, experience, and positions held should be sent not later than 31st March 1957, under confidential cover addressed to The Chairman, River Wear Commissioners, St. Thomas Street, Sunderland, marking the envelope "General Manager."

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